

IISER-M Course Structure BS-MS (revised, applicable to MS23 batch onwards)

Semester I

Course Code	Course Name	Credits
BIO101	Biology I : The basis and diversity of life	3
BIO111	Biology Lab I	1
CHM101	Basic Inorganic Chemistry	3
CHM111	Chemistry Lab I	1
HSS101	Communication Skills	2
IDC101	Introduction to Programming	2
MTH101	Linear Algebra	3
PHY101	Mechanics	3
PHY111	Physics Lab I	1

Semester II

Course Code	Course Name	Credits
BIO102	Biology II : The perpetuity and history of life	3
BIO112	Biology Lab II	1
CHM102	Basic Organic Chemistry	3
CHM112	Chemistry Lab II	1
HSS102	Concepts in Humanities and Social Sciences	2
EES102	Introduction to Environmental Sciences	2
MTH102	Probability and Statistics	3
PHY102	Electricity and Magnetism	3
PHY112	Physics Lab II	1

Semester III

Course Code	Course Name	Credits
HSS201	History of Science	2
One of the following		
IDC20X		2
IDC20Y		2
IDC20Z		2
Two pre-majors		
BIO201	Genes and Development	3
BIO202	Cells and organismal architecture	3
BIO211	Biology Lab III	1
CHM201	Introduction to Spectroscopic Methods	3
CHM202	Chemical Thermodynamics	2
CHM211	Chemistry Lab III	2
EES201	Introduction to Earth Sciences	2
EES202	Introduction to Atmospheric and Climate Science	3
EES211	Basic Mineralogy and Petrology laboratory	2
MTH201	Differential and Integral Calculus	3
MTH202	Elementary Number Theory	2
MTH203	Sequences and Series	2
PHY201	Waves and Optics	3
PHY202	Mathematical Methods for Physicists*	2
PHY211	Physics Lab III	2

* To be available as an IDC course for students who do not take Physics as a pre-major.

Semester IV

Course Code	Course Name	Credits
IDC2XX	Ethics in research	1
One of the following		
IDC20X		2
IDC20Y		2
IDC20Z		2
Two pre-majors		
BIO203	Ecology and Behaviour	3
BIO204	Bioinformatics and Bioengineering	3
BIO212	Biology Lab IV	2
CHM203	Chemical Kinetics	3
CHM204	Electrochemistry, Colloids and Interfaces	3
CHM212	Chemistry Lab IV	2
EES203	Geochemistry	3
EES204	Remote Sensing & GIS	3
EES212	GIS & Mapping lab	2
MTH204	Symmetry	3
MTH205	Analysis in one variable	3
MTH206	Ordinary Differential Equations	2
PHY203	Thermodynamics and Statistical Physics	3
PHY204	Modern Physics	3
PHY212	Physics Lab IV	2

Biology Majors

Semester V

Course Type ¹	Course Code	Course Name	Credits
MM	BIO311	Molecular methods Lab	4
DE			4
DE			4
DE			4
OE			4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	BIO312	Development and Physiology Lab	4
DE			4
DE			4
DE			4
OE			4
SEM	IDC352	Science Communication	2

¹ MM: Major Mandatory, DE: Department Elective, OE: Open Elective, SEM: Seminar Course, PRJ: Project (e.g., MS thesis)

Semester VII

Course Type	Course Code	Course Name	Credits
MM	BIO411	Advanced Biology Lab I	4
DE			4
DE			4
OE			4
OE			4
OE			4

Semester VIII

Course Type	Course Code	Course Name	Credits
MM	BIO412	Advanced Biology Lab – II	4
DE			4
DE			4
OE			4
OE			4
SEM	IDC452	Presentation Skills	2

Chemistry Majors

Semester V

Course Type ²	Course Code	Course Name	Credits
MM	CHM301	Quantum Chemistry - I	4
MM	CHM302	Organic chemistry - Reactions and Mechanisms	4
MM	CHM303	Main Group Chemistry	4
MM	CHM311	Organic Chemistry lab	4
OE			4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	CHM304	Quantum Chemistry - II	4
MM	CHM305	Physical Organic Chemistry	4
MM	CHM306	Transition Metal Chemistry	4
MM	CHM312	Inorganic Chemistry lab	4
OE			4
SEM	IDC352	Science Communication	2

² MM: Major Mandatory, DE: Department Elective, OE: Open Elective, SEM: Seminar Course, PRJ: Project (e.g., MS thesis)

Semester VII

Course Type	Course Code	Course Name	Credits
MM	CHM401	Molecular Spectroscopy	4
MM	CHM402	Chemistry of Materials	4
MM	CHM411	Physical Chemistry lab	4
DE			4
OE			4
OE			4

Semester VIII

Course Type	Course Code	Course Name	Credits
MM	CHM403	Analytical Chemistry	4
MM	CHM404	Statistical Thermodynamics	4
MM	CHM412	Analytical Chemistry Lab	4
DE			4
OE			4
SEM	IDC452	Presentation Skills	2

EES Majors

Semester V

Course Type³	Course Code	Course Name	Credits
MM	EES301	Global Biogeochemical cycles and climate change	4
MM	EES311	Air, Water and Soil Analysis Laboratory	4
DE	DE		4
DE	DE		4
OE	OE		4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	EES302	Quantitative data analysis in earth and environmental sciences	4
MM	EES312	Applied cartography and field mapping	4
DE	DE		4
DE	DE		4
OE	OE		4
SEM	IDC352	Science Communication	2

³ MM: Major Mandatory, DE: Department Elective, OE: Open Elective, SEM: Seminar Course, PRJ: Project (e.g., MS thesis)

Semester VII

Course Type	Course Code	Course Name	Credits
MM	EES401	Natural Hazards and Disaster Risk Assessment	4
MM	EES411	Computational Geosciences Lab	4
DE	DE		4
DE	DE		4
OE	OE		4
OE	OE		4

Semester VIII

Course Type	Course Code	Course Name	Credits
MM	EES402	Environmental Sustainability	4
MM	EES412	Advanced field geology	4
DE	DE		4
DE	DE		4
OE	OE		4
SEM	IDC452	Presentation Skills	2

The Department proposes that it will be mandatory for EES major students to take all their departmental electives from the same basket namely "Geology", "Environmental Science" or "Atmospheric Science". The basket from which the department electives are taken will determine the name of the major that will be written on the degree, namely BS-MS in "Geology", "Environmental Science" or "Atmospheric Science". IISER Bhopal follows this model and awards the degree in either "Geology" or in "Environmental Sciences". IISER Kolkata only offers courses and a degree in "Earth Sciences". The Department is not in favor of awarding a degree in "Earth and Environmental Sciences". No other institution in the country awards such a degree. Students will not be eligible for competitive exams through which major employers such as GSI and IMD hire.

Maths Majors

Semester V

Course Type ⁴	Course Code	Course Name	Credits
MM	MTH301	Real Analysis	4
MM	MTH302	Linear Algebra	4
MM	MTH303	Set Theory and Logic	4
MM	MTH304	Group Theory	4
OE/DE			4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	MTH305	Complex analysis	4
MM	MTH306	Lebesgue Measure and Integration Theory	4
MM	MTH307	Topology	4
MM	MTH308	Rings and Modules	4
OE/DE			4
SEM	IDC352	Science Communication	2

⁴ MM: Major Mandatory, DE: Department Elective, OE: Open Elective, SEM: Seminar Course, PRJ: Project (e.g., MS thesis)

Semester VII

Course Type	Course Code	Course Name	Credits
MM	MTH401	Ordinary Differential Equations	4
MM	MTH402	Functional Analysis	4
MM	MTH403	Fields and Galois Theory	4
DE	At least one of the following		
DE	MTH404	Commutative and Homological Algebra	4
DE	MTH405	Probability Theory	4
DE	MTH406	Manifolds	4
OE/DE			4

Semester VIII

Course Type	Course Code	Course Name	Credits
DE	At least one of the following		
DE	MTH407	Partial Differential Equations	4
DE	MTH408	Algebraic Topology	4
DE	MTH409	Discrete Mathematics	4
OE/DE			4
OE/DE			4
OE/DE			4
OE/DE			4
SEM	IDC452	Presentation Skills	2

**Physics Majors
Semester V**

Course Type⁵	Course Code	Course Name	Credits
MM	PHY301	Classical Mechanics	4
MM	PHY302	Quantum Mechanics	4
MM	PHY303	Electrodynamics	4
MM	PHY310	Mathematical Methods-I	4
MM	PHY311	Advanced Optics Lab	4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	PHY304	Statistical Mechanics	4
MM	PHY306	Quantum Mechanics-II	4
MM	PHY312	Advanced Electronics & Instrumentation Lab	4
OE			4
OE			4
SEM	IDC352	Science Communication	2

⁵ MM: Major Mandatory, DE: Department Elective, OE: Open Elective, SEM: Seminar Course, PRJ: Project (e.g., MS thesis)

Semester VII

Course Type	Course Code	Course Name	Credits
MM	PHY401	Nuclear Physics	4
MM	PHY402	Solid State Physics	4
MM	PHY403	Atomic and Molecular Physics	4
MM	PHY411	Nuclear Physics Lab	4
DE			4
OE			4

Semester VIII

Course Type	Course Code	Course Name	Credits
MM	PHY412	Condensed Matter Physics Lab	4
DE			4
DE			4
OE			4
OE			4
SEM	IDC452	Presentation Skills	2

Project Year

Semester IX

Course Type	Course Code	Course Name	Credits
OE			4
PRJ	PRJ 501 I		8
PRJ	PRJ 501 II		8

Semester X

Course Type	Course Code	Course Name	Credits
OE			4
PRJ	PRJ 502 I		8
PRJ	PRJ 502 II		8