

Course Structure BS-MS (MS23 batch onwards)

Semester I

Course Code	Course Name	Credits
BIO101	The basis and diversity of life	3
BIO111	Biology lab I	1
CHM101	Basic inorganic chemistry	3
CHM111	Chemistry lab I	1
HSS101	Language skills	2
IDC101	Introduction to programming	2
MTH101	Basic linear algebra	3
PHY101	Mechanics	3
PHY111	Physics lab I	1

Semester II

Course Code	Course Name	Credits
BIO102	Genetics and evolution	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	Electromagnetism	3
PHY112	Physics lab II	1

All course numbers will carry v.1 or v.2 suffix in ERP only.

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 ^(c)	Chemical thermodynamics	2 ^(c)
CHM211	Chemistry lab III	2
EES201	Introduction to earth sciences	2
EES202	Introduction to atmospheric and climate science	3
EES211	Basic mineralogy and petrology lab	2
MTH201	Differential and integral calculus	3
MTH202 ^(a)	Elementary number theory	2 ^(a)
MTH203 ^(a)	Sequences and series	2 ^(a)
PHY201	Waves and optics	3
PHY202 ^(b)	Overview of mathematical methods	2 ^(b)
PHY211	Physics lab III	2

^(a) Available for students (as an IDC) who do not take Mathematics as a pre-major.

^(b) Available for students (as an IDC) who do not take Physics as a pre-major.

^(c) Available for students (as an IDC) who do not take Chemistry as a pre-major.

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Semester IV

Course Code	Course Name	Credits
IDC212	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 and GIS	3
EES212	GIS and mapping lab	2
MTH204	Symmetry	3
MTH205	Analysis in one variable	3
MTH206 ^(a)	Introduction to ordinary differential equations	2 ^(a)
PHY203	Thermodynamics and statistical physics	3
PHY204	Modern physics	3
PHY212	Physics lab IV	2

^(a) Available for students (as an IDC) who do not take Mathematics as a pre-major.

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Biology Majors

Semester V

Course Type ¹	Course Code	Course Name	Credits
MM	BIO311A (or) BIO311B	Advanced biology lab I: Molecular methods in biology (or) Advanced biology lab I: Principles and techniques of cell biology	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)

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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

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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)

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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

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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 lab	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

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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

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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

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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	MTH409	Discrete mathematics	4
DE	MTH410	Algebraic topology	4
DE	MTH440	Partial differential equations	4
OE/DE			4
OE/DE			4
OE/DE			4
OE/DE			4
SEM	IDC452	Presentation skills	2

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**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 for physicists I	4
MM	PHY311	Advanced optics and spectroscopy lab	4

Semester VI

Course Type	Course Code	Course Name	Credits
MM	PHY304	Statistical mechanics	4
MM	PHY306	Advanced quantum mechanics	4
MM	PHY312	Advanced electronics and 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)

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Semester VII

Course Type	Course Code	Course Name	Credits
MM	PHY401	Nuclear and particle 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

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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

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