

BS-MS (Dual Degree) CURRICULUM

First Year – Core Courses

I Semester

Course No.	Course Title	Credit
BIO 101	Biology I: Biomolecules	3
BIO 103	General Biology Laboratory	1
CHM 101	General Chemistry	3
HSS 101	English for Communication	2
EES 101	Earth Materials and Processes	3
MTH 101	Calculus of One Variable	3
PHY 101	Mechanics	3
PHY 103	General Physics Laboratory-I	1
PT 101	Physical Training	0
Total		19

II Semester

Course No.	Course Title	Credit
BIO 102	Biology II: Fundamentals of Cell Biology	3
CHM 112	Basic Organic Chemistry-I	3
CHM 114	Chemistry Laboratory- I	1
EES 102	Introduction to Environmental Sciences	3
ECS 102	Introduction to Programming	3
MTH 102	Linear Algebra	3
PHY 106	Quantum Physics	3
Total		19

Pre-Major Year

During the Pre-Major year, credit requirement for per semester is a total of 18/21 credits. Student must register for courses specified by minimum of two disciplines.

III Semester

Biological Sciences

Course No.	Course Title	Credit
BIO 201	Biology III: Fundamentals of Molecular Biology	3
BIO 203	Biology V: Diversity of Life I	3
BIO 205	Biology Laboratory I	1
CHM 211	Basic organic Chemistry-II	3

Chemistry

Course No.	Course Title	Credit
CHM 211	Basic Organic Chemistry-II	3
CHM 221	Basic Physical Chemistry	3
CHM 223	Chemistry Laboratory II	1

Earth and Environmental Sciences

Course No.	Course Title	Credit
EES 201	Atmospheric Sciences	3
EES 203	Geochemistry	4
MTH 201	Multivariable Calculus	3

Mathematics

Course No.	Course Title	Credit
MTH 201	Multivariable Calculus	3
MTH 203	Introduction to Groups and Symmetry	3

Physics

Course No.	Course Title	Credit
PHY 201	Waves and Optics	3
PHY203	Electrodynamics	3
PHY 205	General Physics Laboratory-II	1
ECS 203	Basic Electronics	3
MTH 201*	Multivariable Calculus	3

*Recommended Course from Other Department

IV Semester

Biological Sciences

Course No.	Course Title	Credit
BIO 202	Biology IV: Basic Genetics	3
BIO 204	Biology VI: Diversity of Life II	3
BIO 206	Biology Laboratory II	1
CHM 222	Classical Thermodynamics	3

Chemistry

Course No.	Course Title	Credit
CHM 204	Basic Inorganic Chemistry	3
CHM 206	Chemistry Laboratory III	1
CHM 222	Classical Thermodynamics	3

Earth and Environmental Sciences

Course No.	Course Title	Credit
EES 202	The Evolution of the Earth	3
EES 204	Oceanography	3
EES 206	Introduction to Earth and Environmental Sciences Laboratory	1
CHM 222	Classical Thermodynamics	3

Mathematics

Course No.	Course Title	Credit
MTH 202	Probability and Statistics	3
MTH 204	Complex Variables	3

Physics

Course No.	Course Title	Credit
PHY 202	Physics by Numerical Analysis	3
PHY 204	General Properties of Matter	3
PHY 206	General Physics Laboratory-III	1
CHM 222	Classical Thermodynamics	3
MTH 202*	Probability and Statistics	3

*Recommended Course from Other Department

Professional Courses

BIOLOGICAL SCIENCES

V Semester

Course No.	Course Title	Credit
BIO 301/601	Cell Biology	4
BIO 303/603	Biochemistry I	4
BIO 305/605	Plant Biology I	4
BIO 307	Biology Laboratory III	3
BIO 309/609	Departmental Elective I	4
*** **	Open Elective I	3/4
Total		19

VI Semester

Course No.	Course Title	Credit
BIO 302/602	Biochemistry II	4
BIO 304/604	Molecular Biology	4
BIO 306/606	Immunology I	4
BIO 308	Biology Laboratory IV	3
BIO 310/610	Departmental Elective II	4
*** **	Open Elective II	3/4
Total		22/23

VII Semester

Course No.	Course Title	Credit
BIO 401/621	Immunology II	4
BIO 403/623	Structural Biology	4
BIO 405/625	Developmental Biology	4
BIO 407/627	Departmental Elective III	4
BIO 409/629	Departmental Elective IV	4
*** **	Open Elective III	3/4
Total		23/24

VIII Semester

Course No.	Course Title	Credit
BIO 402/622	Bioinformatics	4
BIO 404/624	Neurobiology	4
BIO 406/626	Evolutionary Ecology	4
BIO 408/628	Departmental Elective V	4
BIO 410/630	Departmental Elective VI	4
*** **	Open Elective VII	3/4
Total		23/24

IX Semester

Course No.	Course Title	Credit
BIO 501	MS Thesis	18
HSS 503 ^s	Law Relating to Intellectual Property and Patents	1
Total		19

X Semester

Course No.	Course Title	Credit
BIO 501	MS Thesis	18
Total		18

^sStudents must clear Law Relating to Intellectual Property and Patents course anytime before completion of BS-MS (Dual Degree) Programme, as and when offered.

CHEMISTRY

V Semester

Course No.	Course Title	Credit
CHM 301	Symmetry and Group Theory	4
CHM 311	Organic Chemistry I	4
CHM 313	Organic Chemistry Laboratory	3
CHM 321	Physical Chemistry of Solutions	4
CHM 325	Mathematical Methods for Chemists	4
*** **	Department/Open Elective I	3/4
Total		22/23

VI Semester

Course No.	Course Title	Credit
CHM 302	Chemistry of Transition Metals	4
CHM 312	Organic Chemistry II	4
CHM 314	Quantitative Methods in Chemistry	4
CHM 322	Principles of Quantum Chemistry	4
CHM ***	Departmental Elective II	4
*** **	Open Elective II	3/4
Total		23/24

VII Semester

Course No.	Course Title	Credit
CHM 401	Main Group Chemistry	4
CHM 403	Inorganic Chemistry Laboratory	3
CHM 411	Physical Organic Chemistry	4
CHM 421	Statistical Mechanics	4
CHM ***	Departmental Elective III	4
*** **	Open Elective III	3/4
Total		22/23

VIII Semester

Course No.	Course Title	Credit
CHM 402	Applications of Modern Physical Methods	4
CHM 416	Spectroscopy and Its Application in Organic Molecules	4
CHM 422	Molecular Spectroscopy	4
CHM 426	Physical Chemistry Laboratory	3
CHM ***	Departmental Elective IV	4
*** **	Open Elective IV	3/4
Total		22/23

IX Semester

Course No.	Course Title	Credit
CHM 501	MS Thesis	10
CHM ***	Departmental Elective V/ Research Credit	4
CHM ***	Departmental Elective VI/ Research Credit	4
HSS 503 ^s	Law Relating to Intellectual Property and Patents	1
Total		19

X Semester

Course No.	Course Title	Credit
CHM 501	MS Thesis	18
Total		18

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EARTH AND ENVIRONMENTAL SCIENCES

V Semester

Course No.	Course Title	Credit
EES 301	Mineralogy	3
EES 303	Structural Geology	3
EES 305	Geohydrology	3
*** **	Open Elective I	3/4
EES ***	Department Elective I	4
EES 311	Mineralogy Laboratory	1
EES 313	Structural Geology Laboratory	1
Total		21/22

VI Semester

Course No.	Course Title	Credit
EES 302	Igneous Petrology	3
EES 304	Environmental Chemistry	3
EES 306	Solid Earth Geophysics	3
*** **	Open Elective II	3/4
EES ***	Department Elective II	4
EES 312	Igneous Petrology Laboratory	1
EES 314	Environmental Chemistry Laboratory	1
EES 316	Basic Field Geology	2
Total		20/21

VII Semester

Course No.	Course Title	Credit
EES 401	Sedimentology and Principles of Stratigraphy	3
EES 403	Metamorphic Petrology	3
EES 405/647	Data Analyses and Statistics for Geosciences	4
*** **	Open Elective III	3/4
EES ***	Departmental Elective III	4
EES 411	Sedimentology Laboratory	1
EES 413	Metamorphic Petrology Laboratory	1
Total		19/20

VIII Semester

Course No.	Course Title	Credit
EES 402/614	Earth Surface Processes	4
EES 404	Geodynamics*	3
EES 406	Global Climate Change**	3
*** **	Open Elective IV	3/4
EES ***	Departmental Elective IV	4
EES 414	Geodynamics Laboratory*	1
EES 416	Global Climate Change Laboratory**	1
EES 408	Advanced Field Geology [#]	3
EES 410	Field Work in Environmental Sciences [#]	3
Total		18/19

[#] Students should register for either one of these two courses

Students should register for both the * or both the ** courses

IX Semester

Course No.	Course Title	Credit
EES 501	MS Thesis	12
EES 505/645	Remote Sensing and GIS	4
EES ***	Departmental Elective V	4
HSS 503 ^{\$}	Law Relating to Intellectual Property and Patents ^{\$}	1
Total		21

^{\$} Students can credit this course during any semester of their BS-MS study, as and when offered

[#] Students can credit this course in the 9th or 10th semester

X Semester

Course No.	Course Title	Credit
EES 501	MS Thesis	16
EES 502/503	Contemporary Environmental Issues	3
Total		19

MATHEMATICS

V Semester

Course No.	Course Title	Credit
MTH 301	Group Theory	4
MTH 303	Real Analysis I	4
MTH 305	Elementary Number Theory	4
MTH ***	Departmental Elective I	4
*** **	Open Elective I	3/4
Total		19/20

VI Semester

Course No.	Course Title	Credit
MTH 302	Rings and Modules	4
MTH 304	General Topology	4
MTH 306	Ordinary Differential Equations	4
MTH ***	Departmental Elective II	4
*** **	Open Elective II	3/4
Total		19/20

VII Semester

Course No.	Course Title	Credit
MTH 401	Fields and Galois Theory	4
MTH 403	Real Analysis II	4
MTH 405	Partial Differential Equations	4
MTH 407	Complex Analysis I	4
*** **	Open Elective III	3/4
Total		19/20

VIII Semester

Course No.	Course Title	Credit
MTH 404	Measure and Integration	4
MTH 406	Differential Geometry of Curves and Surfaces	4
MTH ***	Departmental Elective III	4
*** **	Open Elective IV	3/4
*** **	Open Elective V	3/4
Total		18/20

IX Semester

Course No.	Course Title	Credit
MTH 501	MS Thesis	12
MTH 503	Functional Analysis	4
MTH ***	Departmental Elective V	4
HSS 503 ^s	Law Relating to Intellectual Property and Patents	1
Total		21

X Semester

Course No.	Course Title	Credit
MTH 501	MS Thesis	12
MTH ***	Departmental Elective VI	4
MTH ***	Departmental Elective VII	4
Total		20

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PHYSICS

V Semester

Course No.	Course Title	Credit
PHY 301	Mathematical Methods I	4
PHY 303	Quantum Mechanics I	4
PHY 305	Classical Mechanics	4
PHY 307	Physics Laboratory I	3
*** **	Open Elective I	3/4
Total		18/19

VI Semester

Course No.	Course Title	Credit
PHY 302	Mathematical Methods II	4
PHY 304	Quantum Mechanics II	4
PHY 306	Statistical Mechanics	4
PHY 308	Physics Laboratory II	3
*** **	Open Elective II	3/4
Total		18/19

VII Semester

Course No.	Course Title	Credit
PHY 401	Electrodynamics and Special Theory of Relativity	4
PHY 403	Condensed Matter Physics	4
PHY 405	Condensed Matter Physics Laboratory	3
*** **	Open Elective III	3/4
*** **	Open Elective IV	3/4
Total		17/19

VIII Semester

Course No.	Course Title	Credit
PHY 402	Atomic and Molecular Physics	4
PHY 404	Nuclear and Particle Physics	4
PHY 406	Nuclear Laboratory	3
*** **	Open Elective V	3/4
*** **	Open Elective VI	3/4
Total		17/19

IX Semester

Course No.	Course Title	Credit
PHY 501	Project Work	14
*** **	Open Elective VII	4
*** **	Open Elective VIII	4
HSS 503 ^s	Law Relating to Intellectual Property and Patents	1
Total		23

X Semester

Course No.	Course Title	Credit
PHY 501	Project Work	14
*** **	Open Elective IX	4
*** **	Open Elective X	4
Total		22

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