

Course structure with credit distribution of Integrated M.Sc. Degree under NEP-2020

(Effective from the 2023-2024 Academic Session; credits for each course are given in parenthesis in red)

Credit Definition: 1 Credit = 15 contact hours for theory course and 30 contact hours for laboratory work

		Subject	Major		Minor	Common courses
			Mandatory	Elective		
1st Year (44 credits)	I-Semester (22 credits)	Biology	Biology-I (4) Biology-II (2)	NIL	Chemistry-I (2) Chemistry-I Lab (2)	▪ OE (2)*: Biology-I/ Chemistry-I/ Mathematics-I/ General mathematics-I/ Number system/ Classical mechanics/ Wave Oscillations (* OE courses are not from student's major or minor) ▪ VSC (2): Lab (Bio/ Chem./ Phys.) Number system (for Maths) ▪ SEC (2): Computer Basics ▪ AEC (2): English Communication ▪ VEC (2): Digital & Technological Solutions ▪ CC (2): Positive Psychology
		Chemistry	Chemistry-I (4) Chemistry-II (2)	NIL	For Biology as minor Biology-I (2) Biology Lab-I (2)	
					For physics as minor Classical Mechanics (2) Physics Lab-I (2)	
		Mathematics	Mathematics-I (Analysis) (4) Mathematics-II (Algebra) (2)	NIL	Classical Mechanics-I (4)	
	II-Semester (22 credits)	Physics	Classical Mechanics-I (4) Thermal and modern Physics (2)	NIL	For Biology as minor Biology-I (2) Biology Lab-I (2)	
					For Chemistry as minor Chemistry-I (2) Chemistry-I Lab (2)	
					For Maths as minor Mathematics-I (4)	
		Biology	Biology-III (4) Biology-IV (2)	NIL	Chemistry-III (2) Chem. Lab-II (2)	▪ OE* (4): Biology-III/ Chemistry-III/ General Mathematics-II/ Optics (* OE courses are not from student's major or minor) ▪ VSC (2): Lab (for Bio/ Chem./ Phys.) Number Theory-I (for Maths) ▪ SEC (2): Electronics Lab ▪ AEC (2): Environmental Science ▪ IKS (2): Bio- Ayurveda Chem.- Ancient Indian Chemistry Maths.- Ancient Indian Mathematics Phys.- Indian Astronomy
		Chemistry	Chemistry-III (4) Chemistry-IV (2)	NIL	For Biology as minor Biology (2) Biology Lab-II (2)	
					For physics as minor Electromagnetism (2) Physics Lab-II (2)	
		Mathematics	Mathematics- III (4) (Analysis & Geometry) Mathematics-IV (2) (Linear Algebra)	NIL	Electromagnetism (4)	
		Physics	Electromagnetism (4) Optics (2)	NIL	For Biology as minor Biology - III (2) Biology Lab-II (2)	
					For Chemistry as minor Chemistry-III (4)	
					For Mathematics as minor	

					Mathematics- III (4)	
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		Subject	Major		Minor	Common courses
			Mandatory	Elective		
2 nd Year (44 credits)	III-Semester (22 credits)	Biology	Biochemistry-I (4) Cell Biology-I (4)	NIL	Organic Chemistry-I (4)	▪ OE* (4): Biochemistry-I/ Statistical Techniques/ Essential Mathematics for biologists and chemists / Analysis-I <i>(* OE courses are not from student's major or minor)</i> ▪ VSC (2): Lab (Bio/ Chem./ Phys.) Number Theory-II (for Maths) ▪ AEC (2): Scientific writing ▪ CC (2): Culture/ sports/ drama/ arts
		Chemistry	Inorganic Chemistry-I (4) Organic Chemistry-I (4)	NIL	For Biology as minor Biochemistry-I (4)	
					For physics as minor Statistical Techniques (4)	
		Mathematics	Analysis-I (4) Algebra-I (4)	NIL	Classical Mechanics-II (4)	
		Physics	Classical Mechanics-II (4) Mathematical Physics-I (4)	NIL	For Biology as minor Biochemistry-I (2) Biology Lab-III (2)	
					For Chemistry as minor Biochemistry-I (2) Chemistry-III Lab (2)	
					For Maths as minor Analysis-I (4)	
		IV-Semester (22 credits)	Biology	Biochemistry-II (4) Molecular Biology (4)	NIL	
	Chemistry		Organic Chemistry-II (4) Quantum Chemistry-I (2) Spectroscopy-I (2)	NIL	For Biology as minor Molecular Biology (2) Biology Lab-IV (2)	
					For physics as minor Optics (2) Physics Lab-IV (2)	
	Mathematics		Analysis-II (4) Topology-I (4)	NIL	Quantum Mechanics-I (4)	
	Physics		Mathematical Physics-II (4) Quantum Mechanics-I (4)	NIL	For Biology as minor Biology-IV (2) Molecular Biology (2)	
					For Chemistry as minor Spectroscopy-I (2) Chemistry Lab-IV (2)	
				For Maths as minor Analysis-II (4)		

		Subject	Major		Minor	Common courses
			Mandatory	Elective		
3 rd Year (44 credits)	V-Semester (22 credits)	Biology	Genetics (4) Cell Biology-II (4) Biodiversity (4)	Offered by the School (4)	NIL	- AEC (2): Economics and Entrepreneurship - OJT (4): Lab (for Bio/ Chem./ Phys.) Graph Theory & Applications (for Maths)
		Chemistry	Inorganic Chemistry-II (4) Quantum Chemistry-II (4) Spectroscopy-II (2) Group Theory (2)	Analytical Techniques (4)	NIL	
		Mathematics	Measure Theory (4) Algebra II (Field Theory) (4) Complex Analysis (4)	Differential Equation / Discrete Maths. (4)	NIL	
		Physics	Quantum Mechanics-II (4) Statistical Physics-I (4) Electrodynamics (4)	Numerical Methods (4)	NIL	
	VI-Semester (22 credits)	Biology	Immunology -I (4) Microbiology (4)	Offered by the School (4)	Biophysical Chemistry (4)	- OJT (4): Lab (for Bio/ Chem./ Phys.) Statistics & Applications (for Maths) - RP (2): Reading project to be allocated by the faculty member
		Chemistry	Contemporary Sciences (4) Nuclear Chemistry (4)	Machine learning & AI (4)	For Biology as minor Biophysical Sciences (4)	
					For physics as minor Biophysical Sciences (4)	
		Mathematics	Topology-II (4) Fourier Analysis (2) Algebra III–Module Theory (2)	Number Th.-III/ Probability Th. (4)	Machine learning & AI (4)	
		Physics	Atomic, Molecular & Nuclear Physics-I (4) Solid State Physics (4)	Microprocessor/ Machine learning & AI (4)	For Biology as minor Cell Biology-I (4)	
					For Chemistry as minor Nuclear Chemistry (4)	
					For Maths as minor Topology-I (4)	

		Subject	Major		Minor	Common courses
			Mandatory	Elective		
4 th Year (44 credits)	VII-Semester (22 credits)	Biology	Biotechnology-I (4) Immunology-II (4) Animal Physiology (4) Advanced Bio Lab-I (2)	Offered by the School (4)	NIL	▪ VEC (4): Research Methodology
		Chemistry	Radiation & Photo-Chemistry(4) Molecular Thermodynamics (4) Organometallic Chemistry and Bioinorganic Chemistry (4) Advanced Chemistry Lab-I (2)	Offered by the School (4)	NIL	
		Mathematics	Functional Analysis (4) Commutative Algebra (4) Differential Geometry & Appl. (4) Numerical Analysis (2)	Offered by the School (4)	NIL	
		Physics	Quantum Mechanics-III (4) Classical mechanics-III (4) Atomic, Molecular & Nuclear Physics-II (4) Advanced Physics Lab-I (2)	Offered by the School (4)	NIL	
	VIII-Semester (22 credits)	Biology	Virology (4) Neurobiology (4) Bioinformatics (4) Advanced Bio Lab-II (2)	Offered by the School (4)	NIL	▪ RP (4): Research project in consultation with supervisor
		Chemistry	Materials Chemistry (4) Computational Chemistry (4) Topics in Organic Chemistry (4) Advanced Chemistry Lab-II (2)	Offered by the School (4)	NIL	
		Mathematics	Algebraic Topology (4) Algebraic Number Th.(4) Hyperbolic geometry (2) Differential geometry & Appl.(2)	Offered by the School (4)	NIL	
		Physics	Statistical Physics-II (4) Mathematical Physics-III (4) Astronomy & Astrophysics (4) Advanced Physics Lab-II (2)	Offered by the School (4)	NIL	

		Subject	Major		Minor	Common courses
			Mandatory	Elective		
5 th Year (40 credits)	IX-Semester (20 credits)	Biology	NIL	NIL	NIL	▪ RP (20): Research project in consultation with supervisor
		Chemistry	NIL	NIL	NIL	
		Mathematics	NIL	NIL	NIL	
		Physics	NIL	NIL	NIL	
	X-Semester (20 credits)	Biology	Biotechnology-II (4) Developmental Biology (4) Plant Physiology (4) Advanced Techniques in Bio (4) Imaging Techniques in Bio (2) Advanced Biology Lab-III (2)	NIL	NIL	▪ RP (4): Research project in consultation with supervisor (only for Chemistry/ Physics)
		Chemistry	NIL	Elective-I (4) Elective-II (4) Elective-III (4) Elective-IV (4)	NIL	
		Mathematics	Partial Differential Equation (4) Differential Topology (4)	Elective-I (4) Elective-II (4) Elective-III (4)	NIL	
		Physics	NIL	Elective-I (4) Elective-II (4) Elective-III (4) Elective-IV (4)	NIL	

Course Codes with their respective subjects

Biology Courses		Chemistry Courses	
Course Code	Course	Course Code	Course
B-101(Ma)	Biology-I: Introductory Biology	C-101 (Ma)	Chemistry-I: Structure & Bonding and Introductory Organic Chemistry
B-102(Ma)	Biology-II: Introduction to molecules of life	C-102 (Ma)	Chemistry-II: Properties of Matter
B-101(Mi / OE)	General Biology	C-101 (Mi / OE)	General Chemistry
BL-101 (Mi / VSC)	Biology Laboratory-I	CL-101 (Mi / VSC)	Chemistry Laboratory-I
B-201 (Ma)	Biology-III: Ecology, Ecosystem & Evolution	C-201 (Ma)	Chemistry-III: Chemical equilibrium, thermodynamics and kinetics
B-102 (Ma/ Mi/ OE)	Biology-IV: Cellular Process	C-202 (Ma)	Chemistry: Introductory Inorganic Chemistry
B-201 (Mi)	Biology: Introduction to Evolution	C-201 (Mi)	Introductory thermodynamics and kinetics
BL-201 (Mi)	Biology Laboratory-II	CL-201 (Mi)	Chemistry Laboratory-II
BL-201 (VSC)	Biology Laboratory-II	CL-201 (VSC)	Chemistry Laboratory-II
B-301 (Ma/ Mi/ OE)	Biochemistry-I	C-301 (Ma)	Inorganic Chemistry-I
B-202 (Ma / Mi)	Cell Biology-I	C-302 (Ma / Mi)	Organic Chemistry-I
BL-301 (Mi / VSC)	Biology Laboratory-III	CL-301 (Mi/ VSC)	Chemistry Laboratory-III
B-401 (Ma)	Biochemistry-II	C-401 (Ma)	Organic Chemistry-II
B-402 (Ma/ Mi)	Molecular Biology)	C-402 (Ma)	Quantum Chemistry-I
BL-401 (Mi/ VSC)	Biology Laboratory-IV	C-403 (Ma/ Mi/ OE)	Spectroscopy-I
B-501 (Ma)	Genetics	C-404 (Mi)	Analytical Chemistry
B-502 (Ma)	Cell Biology-II	CL-401 (Mi/ VSC)	Chemistry Laboratory-IV
B-503 (Ma)	Biodiversity	C-501 (Ma)	Inorganic Chemistry-II
BL-501 (OJT)	Biology Laboratory-V	C-502 (Ma)	Quantum Chemistry-II
B-601 (Ma)	Immunology-I	C-503 (Ma)	Spectroscopy-II
B-602 (Ma)	Microbiology	C-504 (Ma)	Group Theory
BL-601 (OJT)	Biology Laboratory-VI	CE-501 (Ma)	Analytical Techniques
B-603 (RP)	Reading Project	CL-501 (OJT)	Chemistry Laboratory-V
B-701 (Ma)	Biotechnology-I	C-601 (Ma)	Contemporary Sciences

B-702 (Ma)	Immunology-II	C-602 (Ma/ Mi)	Nuclear Chemistry
B-703 (Ma)	Animal Physiology	C-603 (Mi)	Biophysical Chemistry
BL-701	Advanced Biology Laboratory-I	C-601 BE/ CE/ PE)	Machine learning & AI
B-801 (Ma)	Virology	CL-601 (OJT)	Chemistry Laboratory-VI
B-802 (Ma)	Neurobiology	C-604 (RP)	Reading Project
B-803 (Ma)	Bioinformatics	C-701 (Ma)	Radiation & Photo-Chemistry
BL-801	Advanced Biology Laboratory-II	C-702 (Ma)	Molecular Thermodynamics
RP-801 (B)	Research project in consultation with supervisor	C-703 (Ma)	Organometallic Chemistry and Bioinorganic Chemistry
RP-901 (B)	Research project in consultation with supervisor	CL-701	Advanced Chemistry Laboratory-I
B-1001 (Ma)	Biotechnology-II	C-801 (Ma)	Materials Chemistry
B-1002 (Ma)	Developmental Biology	C-802 (Ma)	Computational Chemistry
B-1003 (Ma)	Plant Physiology	C-803 (Ma)	Topic in Organic Chemistry
B-1004 (Ma)	Advanced Techniques in Biology	CL-801	Advanced Chemistry Laboratory-II
B-1005 (Ma)	Imaging Techniques in Biology	RP-801 (C)	Research project in consultation with supervisor
BL-1001	Advanced Biology Laboratory-III	RP-901 (C)	Research project in consultation with supervisor
		CE-1001 to CE-1010	Any four electives
		RP-1001 (C)	Research Project
Mathematics Courses		Physics Courses	
Course Code	Course	Course Code	Course
M-101 (Ma)	Mathematics-I: Introduction to analysis)	P-101 (Ma)	Classical Mechanics
M-102 (Ma)	Mathematics-II: Introduction to Algebra)	P-102 (Ma/ OE)	Wave & Oscillations
M-101 (Mi / OE)	General mathematics-I	P-101 (Mi / OE)	Introductory Classical mechanics
M-100 (OE)	Remedial Mathematics	PL-101 (Mi / VSC)	Physics Lab-I
M-103 (VSC / OE)	Number System	P-201 (Ma / Mi)	Electromagnetism
M-201 (Ma)	Mathematics-III: Analysis & geometry	P-202 (Ma/ Mi)	Optics
M-202 (Ma)	Mathematics-IV: Linear Algebra	PL-201 (Mi/ VSC)	Physics Laboratory-II
M-200 (OE)	General Mathematics-II	P-301 (Ma /Mi)	Classical Mechanics-II
M-201 (OE)	Mathematics-III: Analysis & geometry	P-302 (Ma)	Mathematical Physics-I
M-203 (VSC)	Number Theory-I	P-303 (Mi/ OE)	Statistical techniques
M-301 (Ma/ Mi/ OE)	Analysis-I	PL-301 (VSC)	Physics Laboratory-III
M-302 (Ma)	Algebra-I	P-401 (Ma)	Mathematical Physics-II
M-303 (OE)	Essential mathematics for biologists & chemists	P-402 (Ma/ Mi)	Quantum mechanics-I

M-304 (VSC)	Number Theory-II	PL-401 (Mi/ VSC)	Physics Laboratory-IV
M-401 (Ma/ Mi)	Analysis-II	P-501 (Ma)	Quantum Mechanics-II
M-402 (Ma/ Mi)	Topology-I	P-502 (Ma)	Statistical Physics-I
M-403 (OE)	Applications of Differential Equation	P-503 (Ma)	Electrodynamics
M-404 (VSC)	Computational Techniques	PE-501 (Ma)	Numerical Methods
M-405 (SEC)	Algebra Applications	PL-501 (OJT)	Physics Laboratory-V
M-501 (Ma)	Measure Theory	P-601 (Ma)	Atoms, Molecules & Nuclear Physics-I
M-502 (Ma)	Algebra-II: Field Theory	P-602 (Ma)	Solid State Physics
M-503 (Ma)	Complex Analysis	PE-602 (Ma)	Microprocessor
M-504 (OJT)	Graph Theory & Applications	PL-601 (OJT)	Physics Laboratory-VI
ME-501 (Ma)	Differential Equation	P-604 (RP)	Reading Project
ME-502 (Ma)	Discrete Mathematics	P-701 (Ma)	Quantum Mechanics-III
M-601 (Ma)	Topology-II	P-702 (Ma)	Classical mechanics-III
M-602 (Ma)	Fourier Analysis	P-703 (Ma)	Atoms, Molecules & Nuclear Physics-II
M-603 (Ma)	Algebra-III: Module Theory	PL-701	Advanced Physics Laboratory-I
ME-601 (Ma)	Number Theory-III	P-801 (Ma)	Statistical Physics-II
ME-602 (Ma)	Probability Theory	P-802 (Ma)	Mathematical Physics-III
M-604 (OJT)	Statistics and Applications	P-803 (Ma)	Astronomy & Astrophysics
M-604(RP)	Reading Project	PL-801	Advanced Physics Laboratory-II
M-701 (Ma)	Functional Analysis	RP-801 (P)	Research project in consultation with supervisor
M-702 (Ma)	Commutative Algebra	RP-901 (P)	Research project in consultation with supervisor
M-703 (Ma)	Differential Geometry and Applications	PE-1001 to PE-1014	Any four electives
M-703 (Ma)	Numerical Analysis	RP-1001(P)	Research Project
M-801 (Ma)	Algebraic Topology		
M-802 (Ma)	Algebraic Number Theory		
M-803 (Ma)	Hyperbolic Geometry		
M-804 (Ma)	Advanced Differential Equation		
RP-801 (M)	Research project in consultation with supervisor		
RP-901 (M)	Research project in consultation with supervisor		
M-1001 (Ma)	Partial Differential Equation		
M-1002 (Ma)	Differential Topology		
ME-1001 to ME-1005	Any Three electives		

Common Courses			
Course Code	Course	Course Code	Course
SEC-101	Computer Basics	SEC-201	Electronics Laboratory
AEC-101	English Communication	AEC-201	Environmental Science
VEC-101	Digital & Technological Solutions	IKS-201 (B)	Ayurveda
CC-101	Positive Psychology	IKS-201 (C)	Ancient Indian Chemistry
AEC-301	Scientific writing	IKS-201 (M)	Ancient Indian Mathematics
CC-301	Culture/ sports/ drama/ arts	IKS-201 (C)	Indian Astronomy
VEC-401	Ethics and IPR	VEC-701	Research Methodology
FP-401	Field Project		
CEP-401	Community Engagement Project to be allocated by the respective School		
AEC-501	Economics and Entrepreneurship		

Ma		Major	Mi		Minor
OE	-	Open Elective (generic courses not from major or minor)	OJT	-	On Job Training
VSC	-	Vocational Skill Course	FP	-	Field Project
SEC	-	Skill Enhancement Course	CEP	-	Community Engagement Project
AEC	-	Ability Enhancement Course	CC	-	Co-curricular Course
VEC	-	Value Education Course	RP	-	Research Project
IKS	-	Indian Knowledge System			