

# FIVE-YEAR INTEGRATED MASTER OF SCIENCE

## CHEMISTRY

*5-yr Integr. M.Sc. – Chem.*

# CURRICULUM

**for 2015 admissions onwards**

## GENERAL INFORMATION

### Code Numbering:

Each course is assigned an 8-character Code number. The first two digits indicate the year of curriculum revision. The next three letters indicate the Department offering the course. The last three digits are unique to the course – the first digit indicates the level of the course (100, 200, 300, 400 etc.); the second digit indicates the type of the course, viz. 0, 1 and 2 indicate the core courses; 3,4,5,6 and 7 indicate the Elective courses; 8 indicates the Lab. or practical-based courses and 9 indicates Projects.

### ABBREVIATIONS USED IN THE CURRICULUM:

Cat.	-	Category
Cr	-	Credits
ES	-	Exam Slot
L	-	Lecture
P	-	Practicals
T	-	Tutorial

### DISCIPLINES

AVP	-	Amrita Values Programmes
BUS	-	Business Management
CHY	-	Chemistry
CMJ	-	Communication and Journalism
COM	-	Commerce
CSA	-	Computer Science and Applications
CSN	-	Computer Systems and Network
CUL	-	Cultural Education
ECO	-	Economics
ELL	-	English Language and Literature
ENG	-	English
ENV	-	Environmental Sciences
FNA	-	Fine Arts
HIN	-	Hindi
KAN	-	Kannada
LAW	-	Law
MAL	-	Malayalam
MAT	-	Mathematics
MCJ	-	Mass Communication and Journalism
OEL	-	Open Elective
PHY	-	Physics
SAN	-	Sanskrit
SSK	-	Soft Skills
SWK	-	Social Work
TAM	-	Tamil

**SEMESTER I**

Course Code	Course Title	L-T-P	Cr	ES
15ENG101	Communicative English	2 0 2	3	A
	Language Paper I	1 0 2	2	B
15CHY101	General Chemistry I	3 1 0	4	C
15CSA100	Problem Solving and Computer Programming	3 0 0	3	D
15MAT105	Introduction to Calculus and Matrix Theory	3 1 0	4	G
15PHY103	Mechanics	3 1 0	4	E
15CSA180	Problem Solving and Computer Programming Lab.	0 0 2	1	L1
15PHY184	Physics Lab. I	0 0 2	1	L2
15CUL101	Cultural Education I	2 0 0	2	F
<b>TOTAL</b>				<b>24</b>

**SEMESTER II**

Course Code	Course Title	L-T-P	Cr	ES
15ENG121	Professional Communication	1 0 2	2	A
	Language Paper II	1 0 2	2	B
15CHY111	General Chemistry II	3 1 0	4	C
15CSA116	Advanced Computer Programming	3 0 0	3	D
15MAT114	Ordinary Differential Equations and Vector Calculus	3 1 0	4	G
15PHY113	Electricity and Magnetism	3 1 0	4	E
15CHY186	Inorganic Qualitative Lab.	0 0 2	1	L2
15CSA187	Advanced Computer Programming Lab.	0 0 2	1	L1
15PHY186	Physics Lab. II	0 0 2	1	L3
15CUL111	Cultural Education II	2 0 0	2	F
<b>TOTAL</b>				<b>24</b>

**SEMESTER III**

Course Code	Course Title	L-T-P	Cr	ES
15CHY201	Physical Chemistry I	3 1 0	4	A
15CHY202	Inorganic Chemistry I	3 1 0	4	B
15ENV300	Environmental Science and Sustainability	3 0 0	3	D
15MAT227	Introduction to Probability and Statistics	3 1 0	4	C
15PHY203	Basic Electronics	3 1 0	4	E
15CHY281	Inorganic Quantitative Lab. – Volumetric Analysis	0 0 2	1	L1
15SSK201	Life Skills I	1 0 2	2	G
15AVP201	Amrita Values Programme I	1 0 0	1	F
<b>TOTAL</b>				<b>23</b>

**SEMESTER IV**

Course Code	Course Title	L-T-P	Cr	ES
15CHY211	Physical Chemistry II	3 1 0	4	A
15CHY213	Organic Chemistry I	3 1 0	4	B
15MAT236	Integral Transforms	3 1 0	4	D
15PHY214	Waves and Optics	3 1 0	4	C
	Open Elective A*	3 0 0	3	J
15CHY286	Basic Organic Qualitative Lab.	0 0 2	1	L1
15SSK211	Life Skills II	1 0 2	2	G
15AVP211	Amrita Values Programme II	1 0 0	1	F
<b>TOTAL</b>				<b>23</b>

**SEMESTER V**

Course Code	Course Title	L-T-P	Cr	ES
15CHY301	Physical Chemistry III	3 1 0	4	A
15CHY302	Inorganic Chemistry II	3 1 0	4	B
15CHY303	Organic Chemistry II	3 1 0	4	C
	Elective A	3 0 0	3	E
15CHY381	Basic Physical Chemistry Lab.	0 0 5	2	L1
15CHY382	Organic Synthesis and Estimation Lab.	0 0 2	1	L2
15SSK301	Life Skills III	1 0 2	2	G
15CHY390	Live-in-Lab. <sup>@</sup> / Open Elective B*	3 0 0	3	J
<b>TOTAL</b>			<b>23</b>	

**SEMESTER VI**

Course Code	Course Title	L-T-P	Cr	ES
15CHY311	Basics of Analytical Chemistry	3 0 0	3	A
15CHY312	Organic Chemistry III	3 1 0	4	B
15CHY313	Inorganic Chemistry III	3 1 0	4	D
15PHY314	Basic Spectroscopic Techniques	3 1 0	4	C
	Elective B	3 0 0	3	E
15CHY385	Inorganic Quantitative Lab. – Gravimetric Analysis	0 0 5	2	L1
15CHY386	Physical Chemistry Lab. – Instrumental Analysis	0 0 3	1	L2
<b>TOTAL</b>			<b>21</b>	
15CHY399	Project (for Exit-option students)		6	P
<b>TOTAL</b>			<b>27</b>	

**TOTAL (for Exit-option students) = 144**

**SEMESTER VII**

Course Code	Course Title	L-T-P	Cr	ES
15CHY501	Group Theory and Quantum Chemistry	3 1 0	4	A
15CHY511	Concepts in Inorganic Chemistry	3 1 0	4	B
15CHY521	Aromaticity, Stereochemistry and Reaction Mechanism	3 1 0	4	C
	Elective I	3 0 0	3	E
15CHY581	Inorganic Semi-micro Qualitative Analysis Lab.	0 0 6	2	L1
15CHY582	Inorganic Quantitative Analysis Lab.	0 0 6	2	L2
<b>TOTAL</b>			<b>19</b>	

**SEMESTER VIII**

Course Code	Course Title	L-T-P	Cr	ES
15CHY502	Chemical Thermodynamics and Equilibria	3 1 0	4	D
15CHY503	Molecular Spectroscopy	3 1 0	4	C
15CHY512	Reaction Strategies and Functional Group Interconversions	3 1 0	4	A
15CHY522	Coordination Chemistry and Organometallics	3 1 0	4	B
15CHY585	Organic Qualitative Analysis Lab.	0 0 6	2	L1
15CHY586	Organic Quantitative Analysis Lab.	0 0 6	2	L2
<b>TOTAL</b>			<b>20</b>	

**SEMESTER IX**

Course Code	Course Title	L-T-P	Cr	ES
15CHY601	Physical Methods in Chemistry	3 1 0	4	A
15CHY602	Electrochemistry, Energy Systems and Kinetics	3 1 0	4	B
15CHY611	Computational Chemistry	2 1 0	3	C
15CHY612	Heterocyclic and Natural Products Chemistry	3 1 0	4	D
15CHY613	Solid State and Bioinorganic Chemistry	3 1 0	4	E
15CHY681	Advanced Physical Chemistry Lab.	0 0 5	2	L1
15CHY682	Instrumental and Analytical Methods Lab.	0 0 5	2	L2
<b>TOTAL</b>			<b>23</b>	

**SEMESTER X**

Course Code	Course Title	L-T-P	Cr	ES
	Elective II	3 0 0	3	E
15CHY696	Dissertation		10	P
<b>TOTAL</b>			<b>13</b>	

**Total credits for the programme = 213**

**ELECTIVES**

Course Code	Course Title	L-T-P	Cr	ES
<b>Electives A &amp; B (any two)</b>				
15CHY331	Batteries and Fuel Cells	3 0 0	3	E
15CHY332	Corrosion Science	3 0 0	3	E
15CHY333	Green Chemistry	3 0 0	3	E
15CHY334	Industrial Catalysis	3 0 0	3	E
15CHY335	Introduction to Food Chemistry	3 0 0	3	E
15CHY336	Polymer Science	3 0 0	3	E
15CHY337	Surface Science and Coating Technology	3 0 0	3	E
15CHY338	Chemistry of Advanced Materials	3 0 0	3	E
<b>Electives I &amp; II (any two)</b>				
15CHY631	Applied Electrochemistry	3 0 0	3	E
15CHY632	Bioanalytical Chemistry	3 0 0	3	E
15CHY633	Chemistry of Biomolecules	3 0 0	3	E
15CHY634	Industrial Chemistry	3 0 0	3	E
15CHY635	Industrial Stoichiometry	3 0 0	3	E
15CHY636	Material Science and Nanochemistry	3 0 0	3	E
15CHY637	Medicinal Chemistry	3 0 0	3	E
15CHY638	Supramolecular Chemistry	3 0 0	3	E
15CHY639	Nanomaterials for Biomedical Applications	3 0 0	3	E
15CHY640	Industrial Metal Finishing Processes	3 0 0	3	E

**LANGUAGE - Paper I**

Course Code	Course Title	L-T-P	Cr	ES
15HIN101	Hindi I	1 0 2	2	B
15KAN101	Kannada I	1 0 2	2	B
15MAL101	Malayalam I	1 0 2	2	B
15SAN101	Sanskrit I	1 0 2	2	B
15TAM101	Tamil I	1 0 2	2	B

**LANGUAGE - Paper II**

Course Code	Course Title	L-T-P	Cr	ES
15HIN111	Hindi II	1 0 2	2	B
15KAN111	Kannada II	1 0 2	2	B
15MAL111	Malayalam II	1 0 2	2	B
15SAN111	Sanskrit II	1 0 2	2	B
15TAM111	Tamil II	1 0 2	2	B

\* Two Open Elective courses are to be taken by each student, one each at the fourth and the fifth semesters, from the list of Open electives offered by the School.

@ Students undertaking and registering for a Live-in-Lab project, can be exempted from registering for an Open Elective course in the fifth semester.

**OPEN ELECTIVES (3 0 0 3)**

15OEL231	Advertising
15OEL232	Basic Statistics
15OEL233	Citizen Journalism
15OEL234	Creative Writing for Beginners
15OEL235	Desktop Support and Services
15OEL236	Development Journalism
15OEL237	Digital Photography
15OEL238	Emotional Intelligence
15OEL239	Essence of Spiritual Literature
15OEL240	Film Theory
15OEL241	Fundamentals of Network Administration
15OEL242	Gender Studies
15OEL243	Glimpses of Indian Economy and Polity
15OEL244	Graphics and Web-designing Tools
15OEL245	Green Marketing
15OEL246	Healthcare and Technology
15OEL247	History of English Literature
15OEL248	Indian Writing in English
15OEL249	Industrial Relations and Labour Welfare
15OEL250	Introduction to Ancient Indian Yogic and Vedic Wisdom
15OEL251	Introduction to Computer Hardware
15OEL252	Introduction to Event Management
15OEL253	Introduction to Media
15OEL254	Introduction to Right to Information Act
15OEL255	Introduction to Translation
15OEL256	Linguistic Abilities
15OEL257	Literary Criticism and Theory
15OEL258	Macro Economics
15OEL259	Managing Failure
15OEL260	Media Management
15OEL261	Micro Economics
15OEL262	Micro Finance, Small Group Management and Cooperatives
15OEL263	Negotiation and Counselling
15OEL264	New Literatures
15OEL265	Non-Profit Organisation
15OEL266	Personal Effectiveness

15OEL267	Perspectives in Astrophysics and Cosmology
15OEL268	Principles of Marketing
15OEL269	Principles of Public Relations
15OEL270	Science, Society and Culture
15OEL271	Statistical Analysis
15OEL272	Teamwork and Collaboration
15OEL273	The Message of Bhagwad Gita
15OEL274	Understanding Travel and Tourism
15OEL275	Videography
15OEL276	Vistas of English Literature
15OEL277	Web-Designing Techniques