

Revised on: 26-05-2015

UM-DAE Centre for Excellence in Basic Sciences

Outline of course structure for the M.Sc. (Int.) in Chemistry

FIRST YEAR

Semester I

Subject Code	Subject	Contact hrs / week (Theory + Tutorials)	Credits
B101	Biology-I (Introductory Biology)	2 + 1	3
C101	Chemistry-I (Structures & Bonding)	2 + 1	3
M101/100	Mathematics-I	2 + 1	3
P101	Physics-I (Classical Physics)	2 + 1	3
G101	Computer basics	2 + 1	3
H 101	Communication Skills	2 + 1	3
		Lab hrs	Credits
PL101	Physics Laboratory	4	2
CL101	Chemistry Laboratory	4	2
BL101	Biology Laboratory	4	2
GL101	Computer Laboratory	4	2

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Semester II

Subject Code	Subject	Contact hrs / week (Theory + Tutorials)	Credits
B201	Biology-II (Introduction to macromolecules)	2 + 1	3
C201/200	Chemistry-II (chemical thermodynamics)	2 + 1	3
M201	Mathematics-II (linear algebra, Calculus of several variables)	2 + 1	3
P201	Physics-II	2 + 1	3
G201	Electronics and instrumentation	2 + 1	3
G 202	Glimpses of Contemporary Sciences	2 + 1	3
		Lab hrs	Credits
PL201	Physics Laboratory	4	2
CL201	Chemistry Laboratory	4	2
BL201	Biology Laboratory	4	2
GL201	Electronics Laboratory	4	2

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SECOND YEAR

Semester III

Subject Code	Subject	Contact hrs / week (Theory + Tutorials)	Credits
CB 301	Maths III	3 + 1	4
CB 302	Biochemistry-I	3 + 1	4
CB 303	Organic Chemistry-I	3 + 1	4
C 304	Inorganic Chemistry-I	3 + 1	4
H 301	World Literature	2 + 0	2
H 302	History and Philosophy of Sciences	2 + 0	2
CL301	Chemistry Laboratory	6	3
GL301	Applied Electronics Laboratory	4	2

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Semester IV

Subject Code	Subject	Contact hrs / week (Theory + Tutorials)	Credits
PCB 401	Physical Chemistry-I	3 + 1	4
CB 401	Introductory Spectroscopy (UV-vis, fluorescence, IR, Raman, NMR etc.)	3 + 1	4
CB 402 / P403 / CB403	Biochemistry -II / Statistical mechanics / Molecular biology	3 + 1	4
C 401	Group Theory	3 + 1	4
G 401	Statistical Techniques and Applications	3 + 1	4
		Lab hrs	Credits
CL 401	Chemistry Laboratory	6	3
GL 401	Computational Lab and Numerical Methods	4	2

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THIRD YEAR

Semester V

Subject Code	Subject	Contact hrs / week (Theory + Tutorials)	Credits
CB 501	Measurement Science for Chemistry & Biology	3 + 1	4
C 501	Quantum Chemistry	3 + 1	4
C 502	Inorganic Chemistry II	3 + 1	4
C 503	Organic Chemistry II	3 + 1	4
G 501	Earth Science and Energy & Environmental Sciences	3 + 1	4
		Lab contact hours	Credits
CL 501	Chemistry Laboratory	8	4

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Semester VI

Subject Code	Subject	Contact hrs / week (Theory +tutorials)	Credits
CB 601	Biophysical Chemistry	3 + 1	4
C 601	Atomic and molecular spectroscopy	3 + 1	4
C 602	Inorganic Chemistry III	3 + 1	4
C 603	Organic Chemistry III	3 + 1	4
C 604	Nuclear Chemistry	3 + 1	4
H 601	Ethics of Science and IPR	2 + 0	2
		Lab contact hours	Credits
CL 601	Chemistry Laboratory	8	4

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FOURTH YEAR

Semester VII

Subject Code	Subject	Contact hrs / week (Theory +tutorials)	Credits
C 701	Photochemistry	3 + 1	4
C 702	Organic Chemistry IV (Reagents & advanced reaction, retrosynthesis)	3 + 1	4
C 703	Organometallics & Bio-inorganic Chemistry	3 + 1	4
C 704	Physical Organic Chemistry	3 + 1	4
CPr 701	Reading project	-	4
		Lab contact hours	Credits
CL 701	Advanced Chemistry Laboratory-I	8	4

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Semester VIII

Subject Code	Subject	Contact hrs / week (Theory +tutorials)	Credits
C 801	Chemistry of Materials	3 + 1	4
C 802	Macro and Supra-molecular chemistry	3 + 1	4
C 803	Reaction Dynamics	3 + 1	4
C 804	Computational Chemistry	3 + 1	4
		Lab contact hours	Credits
CL 801	Advanced Chemistry Laboratory-II	8	4
CPr 801	Project		4

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FIFTH YEAR

Semester IX

Subject Code	Subject	Contact hrs / week	Credits
CPr 901	Project	-	24
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Semester X

Subject Code	Subject	Contact hrs/per week (Theory +tutorials)	Credits
CE 1001	Elective I	3 + 1	4
CE 1002	Elective II	3 + 1	4
CE 1003	Elective III	3 + 1	4
CE 1004	Elective IV	3 + 1	4
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Total Credits: 240

(P: Physics, M: Mathematics, C: Chemistry, B: Biology, G: General, E: Elective, Pr: Project)

Elective courses:

1. Advanced Quantum Chemistry
2. Advanced Reaction Dynamics
3. Computational Chemistry.

4. Advanced statistical Mechanics
5. Chemical applications of Group theory
6. Photonics and non-linear optical materials.
7. Environmental Chemistry
8. Radio isotopes and Applications
9. Advanced techniques in mass spectrometry and NMR Spectroscopy
10. Advanced topics in Inorganic Chemistry
11. Nano materials and Soft condensed matters
12. Theoretical Organic Chemistry
13. Polymer Chemistry
14. Advanced methods in Organic Synthesis
15. Molecular Bio-Organic Chemistry
16. Chemical Biology