

DEPARTMENT OF CHEMISTRY

University College of Science, Udaipur

Minutes of committee of courses in Chemistry

As per the directives of Chairman, Faculty of Science wide its letter No. No/CS/PA/2011-2793, Dated: 18-02-2011, a meeting of committee of courses in Chemistry was held at 3.00 P.M. on 25th Feb 2011 in the chamber of Head, Department of Chemistry, University College of Science, Udaipur.

The following members are present:-

1. Prof. A.K. Goswami
2. Dr. R.S. Chauhan
3. Dr. Anita Mehta
4. Dr. M.K. Chhangani
5. Dr. Razia Zabeen

External members Prof. K.D. Gupta and Prof. K.M. Gangotri could not attend the meeting.

As directed by the Chairman, Faculty of Science, all the members unanimously elected Prof. A.K. Goswami as convenor of the committee.

Thereafter, under the convenorship of Prof. A.K. Goswami committee resolved as under:

(1.)

(2.)

(3.)

(Dr. R.S. Chauhan)
Member

(Prof. A.K. Goswami)
Convenor

(Dr. Anita
Mehta)
Member

(Dr. M.K. Chhangani)
Member

(Dr. Razia Zabeen)
Member

DEPARTMENT OF CHEMISTRY
M.L.S.U.,Udaipur.

The Faculty Chairman,
Science Faculty,
College of Science, Udaipur.

Subject: Proposed syllabus of M.Sc. (Chemistry) semester scheme and M.Sc. (Industrial Chemistry) semester scheme 2011-12.

Dear Sir,

Please find enclosed copy of minutes of committee of course along with proposed syllabi for M.Sc. (Chemistry) and M.Sc. (Industrial Chemistry) 2011-12 Semester scheme for approval in faculty meeting of 28/02/2011. Please forward it after approval.

Thanking you.

Yours sincerely

(Prof. A.K.Goswami)
Head

MOHANLAL SUKHADIA UNIVERSITY: UDAIPUR
MASTER OF SCIENCE IN CHEMISTRY (SEMESTER SCHEME)

(Effective from Session 2010-11)

1. **Duration of the Course:** The Master of Science (Chemistry) course will be of four semester duration to be conducted in two years. Each semester will be of approximately five months (minimum 90 working days in a semester) duration.
2. **Eligibility:** Candidates seeking admission to the first semester of Master of Science Chemistry must have a B.Sc. or equivalent degree with Chemistry as one of the optional subject/honors' subject

3. Admission

Admission will be made on the basis of the fifty percent weightage to the marks obtained in the entrance examination conducted by the University and fifty percent weightage to total theory marks obtained at the graduation level (Total marks of graduation excluding practical marks) Reservation as per university rules contained in the University Information Bulletin shall be followed.

4. Course structure

Paper No.	Paper C	Paper Name	No. of lecturers/ practicals	Max. Marks		
				Ext.	Int.	Total
SEMESTER-I						
I	S-1041	Inorganic Chemistry	4	75	25	100
II	S-1042	Organic Chemistry	4	75	25	100
III	S-1043	Physical Chemistry	4	75	25	100
IV	S-1044	Environmental & Green Chemistry	4	75	25	100
V	S-1045	Practical (A-Inorganic- B-Organic, C-Physical) + Seminar	18 +18 +18 =54	150	50	200
Total			80	450	150	600
SEMESTER-II						
I	S-2041	Inorganic Chemistry	4	75	25	100
II	S-2042	Organic Chemistry	4	75	25	100
III	S-2043	Physical Chemistry	4	75	25	100
IV	S-2044	Spectroscopic techniques	4	75	25	100
V	S-2045	Practical (A-Inorganic- B-Organic, C-Physical)+ Seminar	18 + 18 + 18 = 54	150	50	200
Total			80	450	150	600
SEMESTER-III						
I	S-3041	Advanced Spectroscopic techniques	4	75	25	100
II	S-3042	Bio-inorganic/bioorganic/biophysical Chem.	4	75	25	100
Elective Subject (Select two papers from any group A/B/C/D)						
III-A	S-3043-A	Coordination Chemistry	4	75	25	100
IV-A	S-3044-A	Advanced Bio-Inorganic Chemistry	4	75	25	100
III-B	S-3043-B	Modern aspects of Organic Chemistry	4	75	25	100
IV-B	S-3044-B	Chemistry of Heterocyclic Compounds	4	75	25	100
III-C	S-3043-C	Chemical Kinetics	4	75	25	100
IV-C	S-3044-C	Nuclear Chemistry	4	75	25	100
III-D	S-3043-D	Fundamentals of analytical Chemistry	4	75	25	100
IV-D	S-3044-D	Modern analytical methods	4	75	25	100
	S-3045-	Practical (A-Inorganic- B-Organic, C-Physical + Seminar	18 + 18 +18 =54	150	50	200

Total			104	450	150	600
SEMESTER IV						
I	CH-4041	Special methods of Analysis	4	75	25	100
II	CH-4042	Photochemistry and supramolecules	4	75	25	100
Special Paper (Select two paper from any group A/B/C/D)						
III-A	S-4043-A	Orgnometallic Chemistry	4	75	25	100
IV-A	S-4044-A	Inorganic Polymers	4	75	25	100
III-B	S-4043-B	Medicinal Chemistry	4	75	25	100
IV-B	S-4044-B	Chemistry of Natural Products	4	75	25	100
III-C	S-4043-C	Advanced Photo and Radio Chem.	4	75	25	100
IV-C	S-4044-C	Solid State & Surface Chemistry	4	75	25	100
III-D	S-4043-D	Analytical techniques	4	75	25	100
IV-D	S-4044-D	Applied analytical method	4	75	25	100
		Practical (A-Inorganic- B-Organic, C-Physical) + Seminar	18 + 18 +18=54	150	50	200
Total			104	450	150	600
Grand			368	1800	600	2400
Total						

5. Scheme of instruction:

Theory: Class room instructions as per lecture schedule announced at the beginning of the course.

5.1 Tutorials: Tutorials will be conducted for following:

To give class room instructions in topics already covered in lectures but students requires detailed explanation/examples

Working out problems, program, demonstration etc. to make students understand the topics.

5.2 Practical: Students are expected to work in the laboratory for 24 hrs/week carrying out practical assignments & projects. Faculty guidance will be available as per practical hours allotted for each paper.

5.4 Seminar: Students are required to give one seminar in each semester (10 to 15 minutes) using Audio visual aids. They will be required to submit detailed written work on the seminar topic. Each teacher giving instructions to the students will be giving one lecture each in each semester to provide latest developments, techniques etc. Attendance in all the seminars by the students is compulsory. Marks proportionate to their absence will be deducted from seminar component of the internal marks.

5.6 Assignments: Teachers will give regular assignments to the students to assess in the topics. Students will be required to complete the same within the stipulated period

5.7 Projects: Students will be required to carry out a project in the last semester.

Only the projects submitted by the candidates as per following guidelines will be evaluated.

- a) Project to be selected by the student at the end of third semester
- b) Progress report must be submitted through supervisor
- c) Project must be submitted before the prescribed last date .
- d) Candidates are required to make a presentation of their project work during their project examination
- e) Students whose projects graded as unsatisfactory will given one more chance to undertake another project under another supervisor /organization.
- f) The project work of the candidates whose progress report is not submitted will be considered as incomplete and may be terminated within two weeks from the prescribed due date.
- g) Students will be allowed to undertake project works only at the bonafide organizations.
- h) Examination of the project work will be conducted by a committee consisting of one internal examiner and one external examiner.

6. ATTENDANCE:

Regular attendance of the student is an important factor in the semester system. University rules regarding implementation of attendance for semester courses will followed

7. Examination scheme:

- 7.1 University shall conduct examinations only after completion of instructions as per course structure of each semester.
- 7.2 Each theory paper shall be of 100 marks (75 marks for written examination of 3-hrs duration and 25 marks for internal assessment
- 7.3 Each practical paper shall be of 100 or 200 depending the number of practical in a semester (75 marks/150 marks for external examination and 25/50 marks for internal marks
- 7.4 Syllabus of each paper shall be divided into five units.
- 7.5 The question paper shall consist total six questions. Part-AS shall consist of one compulsory question of 10 marks with ten parts covering the entire syllabus for which answer must be provided within 20 words for each. Part-B will consist five long answer questions (which requires answers in about 500 words for each) , one from each unit with internal choice. Each question in the part-B will carry 13 marks each.
- 7.5 The Internal marks will be awarded by the teacher concerned and will be put for consideration of a committee consisting of Head/Course Director, Teacher concerned and a senior teacher of the department . The committee will ensure that norms given for internal evaluations are followed in the award of internal marks for each theory & practical paper. Detailed beakup of the internal marks along with attendance of the candidate must be submitted to the university.
- 7.6. To ensure that questions are put within the scope of the course, following materials must be sent to examiners to set question papers

(a) Prescribed syllabus of the paper

(b) Detailed lecture schedule (Minimum 40 Lectures &Tutorials) giving the chapter/section of the text books & Reference book.

(c) Model Question paper

8. Internal evaluation scheme to award internal marks

8.1 Assignments: 40% of the internal assessment marks for each theory paper will be awarded on the basis of the performance in the assignments regularly given to the students.

8.2 Internal examination: 40% of the total internal assessment marks for each theory paper will be awarded on the basis of the performance in the written examination conducted by the faculty, one at the end of the two months and another at the end of the semester.

8.3 Seminar /viva & Oral examination: 20% of the total internal assessment marks for each paper will be awarded on the basis of the performance in a seminar and Internal viva examination. At least one Internal Viva Voice examination per paper will be conducted by a committee consisting local examiners preferably during internal examination.

8.4 Students are required to keep record of the assignments, Seminars and answer books of the internal examinations and present them at the end of the semester to the advisory board of the course. The attendance / Lab log book and performance sheet of each student will be examined by the board .The internal marks awarded by the teacher will be moderated by the advisory board if necessary.

8.5 If a student has undertaken project work but failed to submit Project report before the prescribed date for submission, he/she shall be declared failed in IV semester. However he/she will be allowed to submit the same whenever next Semester examination is conducted and internal marks will be carried over.

9. Minimum passing marks and criteria for promotion to next higher semester

9.1 The minimum marks for passing a semester shall be 36% in each paper and 40% marks in the aggregate.

9.2 A candidate may be promoted to the next semester if he or she has secured at least 36% marks in each papers but has failed to secure 40% marks in aggregate. He/she shall be required appear in one or more of the papers of the papers as and when these papers are offered again by the university so as to satisfy the passing criteria laid in 10.1. However, candidate will not be allowed to reappear in the practical papers to improve the percentage.

9.3 A candidate may be promoted to the next semester if he/she has secured at least 36% marks in four papers prescribed in the first semester, provided that aggregate of marks in all papers together is at least 40%. Such candidate shall be required to appear in papers in which he/she has secured less than 36% marks when these courses are offered again so as to satisfy the passing criteria laid in 10.1

9.4 A candidate fails to satisfy the criteria 10.1, 10.2, and 10.3 for promotion to next higher semester shall be required to rejoin the semester in which he/she has failed

to satisfy the above criteria, if otherwise eligible in accordance with the university regulations laid in this regard.

9.5 In case result of a semester is not declared by the university, before the starting of the next higher semester, the students who have appeared in all the papers in the semester will be allowed to attend the class of the next higher semester at their own risk. Candidates who are not eligible to be promoted to the next higher semester will have to leave that semester.

10. RESULT

At the end of final examination the candi

Degree in Chemistry. Degree shall be classified on the basis of the marks obtained in the first, second, third and fourth semester examination taken together, as follows:

(a) First Division

60% or more of aggregate marks of all semesters

(b) Second Division

48% or more but less than 60% of aggregate of all semesters

(c) Third Division

40% or more but less than 48% of aggregate marks of all semesters

A candidate must pass the M Sc examination within three years of the initial admission to the first semester of the course

SEMESTER
Paper S-1041
Inorganic chemistry

Time: 3 Hrs.

M.M. 75 marks

Note: The paper will be divided into two sections.

Section-A One question with 10 parts (short answer word limit 20) spread over whole syllabus. Each part will be of 1 mark and candidate is required to attempt all the ten parts

Total 10 marks

Section-B Five questions (answer not exceeding 500 words) are from each Unit with internal choice will be asked and the candidate is required to attempt all five questions. Each question will be of 13 marks

65 marks

Total

UNIT-I

Stereochemistry and Bonding in Main Group Compounds, VSEPR, Walsh diagrams (tri and penta-atomic molecules), $d_{\pi}-p_{\pi}$ bonds, Bent rule and energetics of hybridization, some simple reactions of covalently bonded molecules

Metal-Ligand Bonding: Limitation of crystal field theory, molecular orbital theory, octahedral, tetrahedral and square planar molecular orbital theory.

UNIT-II

Metal-Ligand Equilibria in Solution: Stepwise and overall formation constants and their interaction, trends in stepwise constants, factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, chelate effect and its thermodynamic origin, determination of binary formation constants by pH-metry and spectrophotometry

UNIT-III

Reaction Mechanism of Transition Metal Complexes: Energy profile of a reaction, reactivity of metal complexes, inert and labile complexes, kinetic application of valence bond and crystal field theories, kinetics of octahedral substitution, acid hydrolysis, factors affecting acid hydrolysis, base hydrolysis, conjugate base mechanism, direct and indirect evidences in favor of conjugate mechanism, anation reactions, reactions without metal ligand bond cleavage

UNIT-IV

Substitution reactions in square planar complexes, the trans effect, mechanism of the substitution reaction. Redox reactions, electron transfer reactions, mechanism of one electron transfer reactions, outersphere type reactions, cross reactions and Marcus-Hush theory, inner sphere type reactions.

UNIT-V

Electronic Spectra and Magnetic Properties of Transition Metal Complexes: Spectroscopic ground states, correlation, Orgel and Tanabe-Sugano diagrams for transition metal complexes (d^1-d^9 states), Calculations of Dq ,

charge transfer spectra, spectroscopic method of assignment of absolute configuration in optically active metal chelates and their stereochemical information, anomalous magnetic moments, magnetic exchange coupling and spin crossover.

Books Recommended:

1. Advanced Inorganic Chemistry, F.A.Cotton and Wilkinson, John Wiley
 2. Inorganic Chemistry, J.E.Huhey, Harpes & Row
 3. Chemistry of the Elements, N.N. Greenwood and A. Earnshaw, Pergamon.
 4. Inorganic Electronic Spectroscopy, ABP Lever, Elsevier
- Magnetochemistry, R.L. Carlin, Springer Verlag