SARDAR PATEL UNIVERSITY
Vallabh Vidyanagar, Gujarat
(Reaccredited with 'A' Grade by NAAC (CGPA 3.25)
Syllabus with effect from the Academic Year 2022-2023

PROGRAMME STRUCTURE
Master of Science in Chemistry
MSc (Inorganic Chemistry) Semester: III

Programme Outcome (PO) - For MSc Chemistry Programme	Master of Science program provides extended theoretical and practical knowledge of different science subjects. Master of Science programme at Sardar Patel University is designed keeping the overall back ground preparation in mind for the student to either seek a job or to become an entrepreneur. The students, after completion of Bachelor of Science can select the master's programme in the subject they have had at the final year or in a related discipline (depending upon eligibility criteria prescribed by university). **Programme outcomes: At the end of the program, the students will be able to** 1. Have a deep understanding of both the theoretical and practical concepts in the respective subject. 2. Understand laboratory processes and use scientific equipments and work independently. 3. Develop research temperament as a consequence of their theory and practical learning. 4. Communicate scientific information in oral and written form. 5. Understand the issues related to nature and environmental contexts and think rationally for sustainable development. 6. The students are able to handle unexpected situations by critically analyzing the problem.
Programme Specific Outcome (PSO) - For MSc Chemistry Semester - I	Students will have a firm foundation in the fundamentals and application of current chemical and scientific theories including those in Analytical Inorganic Chemistry, Organic Chemistry, Physical Chemistry, Chemistry and Industrial polymer Chemistry. After completing M.Sc. chemistry program, students will be able to: ■ Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Chemistry. ■ Apply knowledge to build up small scale industry for developing endogenous product. ■ Collaborate effectively on team-oriented projects in the field of chemistry or other related fields. ■ Communicate scientific information in a clear and concise manner both orally and in writing. ■ Inculcate logical thinking to address a problem and become result oriented with a positive attitude. ■ Enhance the scientific temperament among the students so as to develop a research culture and implementation of the policies to tackle the burning issues at global and local level.

	■ Apply the knowledge to develop the sustainable and eco-friendly technology. ■ Take up global level research opportunities to pursue Ph.D programme targeted approach and specific competitive exams conducted by service commission ■ Accept enormous job opportunities at all level of chemical industries, pharmaceutical industries and placements in R & D.

To Pass	At least 40% Marks in the University Examination in each paper and 40% Marks in the aggregate of University and Internal examination in each course of Theory, Practical & 40% Marks in Viva-voce.

Course Type	**Course Code**	**Name of Course**	**Type of Course**	**T /P**	**Credit**	Hours per Week	**Exam Duration in hrs**	**Component of Marks**		
								Internal	**External**	**Total**
								Total/ Passing	**Total/ Passing**	**Total/ Passing**
Core Course	PS03CINC51	Spectroscopy - I	EM & EN	T	4	4	3	30/10	70/28	100/40
	PS03CINC52	Inorganic reactions and Reaction Mechanism	EM	T	4	4	3	30/10	70/28	100/40
	PS03CINC53	Organometallic Compounds	EM	T	4	4	3	30/10	70/28	100/40
Core Course (Any One)	PS03CINC54	Practicals **OR**	EM&SD	P	4	8	6	30/10	70/28	100/40
	PS03CINC55	Project Work	EM&SD	P	4	8		30/10	70/28	100/40
Core Course (Any One)	PS03CINC56	Practicals **OR**	EM&SD	P	4	8	6	30/10	70/28	100/40
	PS03CINC57	Project Work	EM&SD	P	4	8		30/10	70/28	100/40
Core Course	PS03CINC58	Comprehensive Viva		-	1	1			50/20	50/20
Elective Course (Any one)	PS03ECHE51	Separation methods	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE52	Analytical techniques in Materials characterization	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE53	Applications of Inorganic Chemistry in Industry	EM& EN	T	4	4	3	30/10	70/28	100/40

	PS03ECHE54	Selected Topics in Advanced Inorganic Chemistry-I	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE55	Mechanical and Electrical Properties of Polymers	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE56	Selected Topics in Polymers-I	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE57	Advanced Characterization Techniques	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE58	Selected Topics in Physical Chemistry- II	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE59	Selected Topics in Organic Chemistry	EM& EN	T	4	4	3	30/10	70/28	100/40
	PS03ECHE60	Occupational Practices	EM& EN	T	4	4	3	30/10	70/28	100/40
					25					650
Add-on Course		MOOCs course from Swayam Portal								

EMPLOYABILITY = EM, ENTREPRENEURSHIP = EN and SKILL DEVELOPMENT = SD

* Project work **(as optional) in place of practicals; to be offered to some of the students, based on their merit, interest and placement with the teachers (Marks : 200). The project shall have to be carried out under the allotted teacher(s) and a dissertation shall be submitted and will be assessed for internal (60 marks) and external (140 marks), in the usual manner.**

Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC51	Title of the Course	Spectroscopy-I
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. The students explain the basic theory of important spectroscopic techniques. 2. The students apply spectroscopic techniques for qualitative and quantitative analysis of organic and inorganic substances. 3. The students analyse spectral data to elucidate the structures of organic and inorganic molecules/ species. 4. The students predict the possible uses of spectroscopic techniques in analysis of chemicals.

Course Content		
Unit	Description	Weightage* (%)
1.	Infrared Spectroscopy Theory of Infrared (IR) Spectroscopy, Molecular vibrations, Characteristic group absorption frequencies, Interpretation of spectra. Ultraviolet Spectroscopy Theory of electronic transition and Ultraviolet (UV) absorptions, chromophores and auxochromes, Woodward-Fisher rules, Fieser-Kuhn rule, Characteristic absorptions in various compounds, Interpretation of UV spectra	25%
2.	Nuclear Magnetic Resonance Spectroscopy ^{1}H Nuclear Magnetic Resonance (^{1}H NMR) spectroscopy, Chemical shifts and factors affecting chemical shifts, Splitting of the signals – spin couplings and coupling constants, Chemical shift equivalence and magnetic equivalence, ^{13}C-NMR spectroscopy, Proton coupled and decoupled ^{13}C NMR spectra, Chemical shifts in ^{13}C NMR spectra and their calculation, ^{13}C-^{1}H coupling constants, ^{13}C - DEPT spectra, Nuclear Overhauser Effect, NMR Spectroscopy of other important spin ½ nuclei (^{15}N, ^{19}F, ^{27}Al, ^{29}Si, ^{31}P), Interpretation of NMR spectra	25%
3.	Electron Spin Resonance Spectroscopy Theory of Electron Spin Resonance (ESR) Spectroscopy, Instrumentation, Factors affecting the g-values, Differences between NMR and ESR, Hyperfine interactions, Interpretation of ESR spectra, Applications of ESR	25%
4.	Mass Spectroscopy Theory of Mass Spectroscopy, Instrumentation, Ionization techniques, Mass analyzers, Fragmentations and rearrangements, Interpretation of	25%

	mass spectra, Determination of molecular formula, Mass spectra of some chemical classes	

Teaching-Learning Methodology	Class room teaching, seminars, quizzes, and assignments

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Explain the theory, instrumentation and application of important spectroscopic techniques such as IR, UV-vis, NMR and mass spectrometry.
2.	Determine the structure of organic and inorganic compounds using spectroscopic techniques.
3.	Analyse the spectral data of organic and inorganic substances.
4.	Acquire the knowledge of instrumentation of various modern spectrometers.

Suggested References:	
Sr. No.	References
1.	Spectroscopic Identification of Organic Compounds by R. M. Silverstein and F. X. Webster, 6th edition, John Wiley & Sons.
2.	Introduction to Spectroscopy by D. L. Pavia, G. M. Lampman and G. S. Kriz, 3rd edition, Thomson Brooks/Cole.
3.	Spectroscopic Methods in Organic Chemistry by D. H. Williams and I. Fleming, 4th edition, McGraw–Hill Book Company.

4.	Organic Spectroscopy by William Kemp, 3rd edition, Palgrave.
5.	Organic Spectroscopy–Principles and Applications by Jag Mohan, 2nd edition, Narosa Publishing House.
6.	Spectroscopy of Organic Compounds by P. S. Kalsi, 5th edition, New Age International Publishers.

On-line resources to be used if available as reference material
On-line Resources
www.nptel.ac.in
www.swayam.gov.in
www.epgp.inflibnet.ac.in (e-PG pathshala)
www.ndl.iitkgp.ac.in (National Digital Library)

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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC52	Title of the Course	Inorganic reactions and Reaction Mechanism
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. The students explain the fundamentals of important mechanism of reactions in inorganic chemistry. 2. The studentsexplain different ligandsubstitution reactions and methods for calculating stability constant of reactions. 3. The students explain redox reactions. 4. The students explain the photo-inorganic chemistry and its importance. 5. The studentsexplain different types of nuclear reactions and their application in various fields.

Course Content		
Unit	Description	Weightage * (%)
1.	**Ligand substitution reactions of complexes** Ligand substitution reactions, Classification of mechanism, Ligand substitution in square-planar complexes, Ligand substitution in octahedral complexes, Mechanism of in Ligand substitution reactions, Factors affecting Ligand substitution reactions, Stereochemistry in Ligand substitution reactions, Acid and base catalyzed hydrolysis of complexes, Isomerisation and racemization of octahedral complexes Reactions on coordinated ligands, Methods for Determining Stability Constants of Coordination Compounds such as spectrophotometry, Conductometry, Potentiometry and Polarography (Numerical Problems expected), Stability Constants of Mixed Ligand Complexes	25%
2.	**Redox reactions of complexes** Redox reactions, Classification of redox reactions, Reaction mechanism, Outer sphere electron transfer reactions, Inner sphere electron transfer reactions, Marcus theory, Two electron transfer reactions, Complementary and Noncomplementary reactions, Inorganic photochemical reactions, Adamson's rules, Oxidation and reduction of carbonyls.	25%
3.	**Photo-inorganicChemistry** Basics of photochemistry, quantum efficiencies and quantum yield, consequences oflightabsorption,luminescence,mutageniceffectofradiation,properties of the	25%

	excitedstates,excitedstatesofmetalcomplexes,ligandfieldphotochemistry	
4.	**Nuclear reactions** Nuclear particles, Nuclear binding energy, Stability of nuclei, Nuclear fission, Nuclear fusion, Nuclear reactions, Radioactivity, Artificial radioactivity, Applications of radioactivity in analytical chemistry, biochemistry, Age determinations, Medical applications, Agricultural application and industrial applications.	25%

Teaching-Learning Methodology	Classroom teaching, assignments, quizzes, and seminars

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Explain the basic concepts of nuclear chemistry and reactions in inorganic compounds.
2.	Acquire the knowledge of various ligand substitution reactions and calculation of stability constants.
3.	Outline the mechanism of various redox reactions in coordination compounds.
4.	Apply theoretical approach to substitution mechanism, and kinetic application of crystal field theory.
5.	Acquire the knowledge of photo-inorganic chemistry.

Suggested References:	
Sr. No.	References

1.	Inorganic Chemistry by Alan G. Sharpe, Pearson Pub.
2.	Nuclear Chemistry and its applications by M. Haissinky, Addison-Wesley Pub.
3.	Mechanism of Inorganic Reactions by F. Basolo and R. G. Persons, Wiley Pub.
4.	Reaction Mechanism of Coordination Compounds by C. H. Langford and H. B. Gray.
5.	Inorganic Reaction Mechanisms by M. L. Tobe, Nelson Pub.
6.	Inorganic Chemistry by K.F. Purcell and J. C. Kotz.
7.	Fundamental Principles of Inorganic Chemistry by D. Banerjea
8.	Inorganic Chemistry by Shriver and Atkins
9.	Inorganic Chemistry by James E. huheey, Ellen A. Keiter and Richard L. Keiter
10.	Essentials of Nuclear Chemistry by H. J. Arnikar, Wiley Eastern Limited, New Delhi
11.	Elements of Nuclear Chemistry by R. Gopalan, Vikas Publishing House Pvt.Ltd.
12.	Nuclear Chemistry, Bernard G. Harvey by Prentice - Hall, Inc., Englewood Cliffs, N.J.

On-line resources to be used if available as reference material
On-line Resources
www.nptel.ac.in
www.swayam.gov.in
www.epgp.inflibnet.ac.in (e-PG pathshala)
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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC53	Title of the Course	Organometallic Compounds
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. The students synthesize different types of organometallic compounds. 2. The students identify the features influencing the stability and reactivity of organometallic compounds. 3. The students apply organometallic compounds as reagents and catalysts in organic synthesis, as medicine and in agriculture. 4. The students explain mechanism of industrially important reactions involving organometallic compounds as catalyst and reagent.

Course Content

Unit	Description	Weightage* (%)
1.	Introduction to organometallic compounds: Introduction, classifications and general characteristics of organometallic compounds, Organometallic compounds of main group elements: ionic, σ-bonded and electron deficient Organometallic compounds, characteristics, stability, preparative methods, group trends and typical chemical reactions, Organometallic compounds of transition metals: σ-bonded organometallic compounds and π-bonded organometallic compounds, synthesis, properties and typical reactions	25%
2.	Synthetic and catalytic aspects of main group organometallic compounds: Synthetic applications of main group organometallic compounds as stochiometric reagents–organolithium, organosodium, organopotassium, organomagnesium, organozinc, organocadmium, organomercury, organoboranes, organoaluminium, organothalium, organosilicon and organotin, Catalytic applications of main group organometallic compounds	25%
3.	Transition metal organometallic compounds as catalysts and synthetic reagents: Catalytic processes involving transition metal organometallic compounds as homogeneous catalysts – hydrogenation, hydroformylation, oxidation, isomerization, dimerization and polymerization of alkenes and alkenes metathesis, Catalytic processes based on carbon monoxide and transition metal organometallic compounds as catalysts, Mechanism of reactions catalyzed by transition metal organometallics, Applications of transition metal	25%

	organometallic compounds as synthetic reagents	
4.	Biological application and environmental aspects of organometallic compounds: Introduction, Organometallics in medicine, Organometallics in agriculture and horticulture, Organometallics in industry, environmental aspects of organometallic compounds.	25%

Teaching-Learning Methodology	Class room teaching, seminars, quizzes, and assignments

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Proceed for the preparation of different types of organometallic compounds.
2.	Apply organometallic compounds as reagents and catalysts in organic synthesis.
3.	Apply organometallic compounds in medicine and in agriculture.
4.	Explain mechanism of catalysis of industrial processes involving organometallic compounds as reagent and catalyst.

Suggested References:	
Sr. No.	References
1.	Organometallic Compounds, Vol.1 & 2 by G.E. Coates, M.L.H. Green and K. Wade, Metheun & Co. Ltd. London EC4.
2.	Organometallic Compounds by G.E. Coates, John Wiley & Sons, Inc., New York.

3.	Organometallic Chemistry by H. Zeiss, Reinhold Publishing Corporation, New York.
4.	Organometallic Chemistry by R.C. Mehrotra & Anirudh Singh, New Age International (P) Limited, Publishers, New Delhi.
5.	Progress in Inorganic Chemistry, Vol. 1 by F.A. Cotton, Interscience, Pub.Inc., New York.
6.	Organotransition Metal Chemistry by John F. Hartwing, University Science Books, Sausalito, California.

On-line resources to be used if available as reference material
On-line Resources
www.nptel.ac.in
www.swayam.gov.in
www.epgp.inflibnet.ac.in (e-PG pathshala)
www.ndl.iitkgp.ac.in (National Digital Library)

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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC54 (Practical)	Title of the Course	Synthesis and structural characterization of coordination compounds
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	1. The students synthesize different types of coordination compounds. 2. The students analyse the characteristics of coordination compounds by different techniques. 3. The students apply various techniques to quantify the metal ions.

Course Content	
Description	Weightage* (%)
Synthesis and structural characterization of following coordination compounds 1. Synthesis of bis(salicylidene)ethylenediamine Co (II) complex. 2. Synthesis of bis(8-quinolinol)bis(benzylidene)ethane-1,2-diamine Ni(II) complex. 3. Synthesis of bis(8-quinolinol)bis(4-methoxybenzylidene)ethane-1,2-diamine Co(II) complex. 4. Synthesis of bis(8-quinolinol)bis(benzalidene)ethylenediamine Cu(II) complex. 5. Synthesis of bis(salicylidene) thiosemicarbazide Ni (II) (TSC) complex. 6. Synthesis of bis(salicyldehydato)diaquacobalt(II) chelate 7. Synthesis of bis(salicylidene)bis(4-chlorobenzylidene)ethane-1,2-diamine Cu(II) complex. 8. Synthesis of tris (acetylacetonato) Mn(III) chelate 9. Synthesis of bis(8-quinolinol)bis(4-hydroxy benzylidene)ethane-1,2-diamine Cu(II) complex. 10. Synthesis of bis(8-hydroxy quinoline)bis(4-chloro benzylidene)*o*-phenylenediamine with Cu(II) complex. 11. Synthesis of mercury tetrathiocyanate cobalt(II) 12. Miscellaneous	100%

Teaching-Learning Methodology	Laboratory exercises

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Proceed for the synthesis of different types of coordination compounds.
2.	Determine the characteristics of coordination compounds by different techniques.
3.	Analyze the metal ions by various techniques.

Suggested References:	
Sr. No.	References
1.	Qualitative Chemical semimicro analysis by V. N. Alexeyev, Mir Publishers Moscow.
2.	Vogel's Qualitative Inorganic Analysis by G. Svehla, Orent Longman, New Delhi.
3.	Vogel's Textbook of Quantitative Chemical Analysis, 5^{th} edition by G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney, ELBS Publication, 1996, Chapter 2, 3, 11.

On-line resources to be used if available as reference material
On-line Resources
www.nptel.ac.in
www.swayam.gov.in
www.epgp.inflibnet.ac.in (e-PG pathshala)
www.ndl.iitkgp.ac.in (National Digital Library)

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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC55	Title of the Course	Project work
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. The students apply theoretical knowledge of synthetic and analytical chemistry to synthesize and characterize the compounds/ materials important as drug delivery and release systems, adsorbents, gas storage materials, catalysts, etc. 2. The students analyse the inorganic compounds/ materials using modernanalytical and spectroscopic techniques. 3. The studentsapplythe synthesized compounds/ materials for various applications. 4. The students learn about research for pursuing higher studies in research and working in industry.

Course Content	
Description	Weightage* (%)
Research work in laboratory on a topic given by the supervisor	100%

Teaching-Learning Methodology	Laboratory exercise and thesis writing

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Presentation and Viva-voce Examination (As per CBCS R.6.8.3)	30%
2.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to proceed for literature survey, synthesis and characterization of inorganic compounds/ materials using modern analytical and spectroscopic techniques and their study for various applications. They will be trained in research for pursuing higher studies. They will get training for working in

research in academic and industries.

Suggested References: Published research articles on given research topic.

On-line resources to be used if available as reference material
Published papers by reputed publishers like American Chemical Society, Royal Society of Chemistry, Wiley, Elsevier, etc.

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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC56 (Practical)	Title of the Course	Spectrophotometric techniques
Total Credits of the Course	4	Hours per Week	8

Course Objectives:	1. The students analyze the characteristics and composition of complexes by spectrophotometeric techniques. 2. The students apply spectrophotometeric techniques for the determination of the amount of metals in solutions.

Course Content	
Description	Weightage* (%)
Spectrophotometric techniques 1. Determine the composition of the complexes formed in the system Fe(III) salicaldehyde in acidic medium pH-2 by mole ratio method. 2. Determine the nature of the complexes formed in the system Cu(II) ethylene diamine in water. 3. Determine the nature of the complexes formed in the system Ni(II) ethylene diamine in water. 4. Determine the nature of the complexes formed in the system Fe(III) salicaldehyde/5- suphosalicylic acid in acidic medium (0.01M W.R.T HNO_3) using spectrophotometric method. 5. Determine the composition of the complexes formed in the system Cu(II) ethylene diamine in acidic medium pH-2 by slope ratio method. 6. Determine the composition of the complexes formed in the system Ni(II) ethylene diamine in acidic medium pH-2 by slope ratio method. 7. Determine the composition of the complexes formed in the system Fe(III) ethylene diamine in acidic medium pH-2 by slope ratio method. 8. Determine the composition of the complexes formed in the system Cu(II) ethylene diamine in acidic medium pH-2 by mole ratio method. 9. Determine the composition of the complexes formed in the system Ni(II) ethylene diamine in acidic medium pH-2 by mole ratio method. 10. Determine the stability constant of the complexes formed in the system Cu(II) ethylene diamine by Job's method of continuation variation 11. Determine the stability constant of the complexes formed in the system Ni(II) ethylene diamine by Job's method of continuation variation 12. Determine the stability constant of the complexes formed in the system Fe(III) salicaldehyde/5-suphosalisylic acid in acidic medium(pH-2) by Job's method of continuation variation. 13. Determine spectrophotometrically the pK value of an indicator (the acid dissociation constant of methyl red. 14. Determination of concentration of cobalt and chromium in a given mixture of the sample. 15. Miscellaneous	100%

Teaching-Learning Methodology	Laboratory exercises

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Analyze the properties and composition of different types of complexes by spectrophotometeric techniques.
2.	Determine the amount of metals in solutions.

Suggested References:	
Sr. No.	References
1.	Modern Analytical Chemistry, 1st Edition by D. Harvey, The McGraw-Hill Pub, 2000.
2.	Instrumental Methods of Analysis, 4th edition by G.W. Ewing, McGraw Hill Ltd., 1970.
3.	Physical Methods in Inorganic Chemistry by R. S. Drago, John-Wiley Pub., 1975.

On-line resources to be used if available as reference material
On-line Resources
www.nptel.ac.in
www.swayam.gov.in
www.epgp.inflibnet.ac.in (e-PG pathshala)
www.ndl.iitkgp.ac.in (National Digital Library)

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Master of Science, Inorganic Chemistry
M.Sc. Inorganic Chemistry, Semester (III)

Course Code	PS03CINC57	Title of the Course	Project work
Total Credits of the Course	4	Hours per Week	4

Course Objectives:	1. The students apply theoretical knowledge of synthetic and analytical chemistry to synthesize and characterize the compounds/ materials important as drug delivery and release systems, adsorbents, gas storage materials, catalysts, etc. 2. The students analyse the inorganic compounds/ materials using modern analytical and spectroscopic techniques. 3. The students apply the synthesized compounds/ materials for various applications. 4. The students learn about research for pursuing higher studies in research and working in industry.

Course Content	
Description	Weightage* (%)
Research work in laboratory on a topic given by the supervisor	100%

Teaching-Learning Methodology	Laboratory exercise and thesis writing

Evaluation Pattern

Sr. No.	Details of the Evaluation	Weightage
1.	Internal Presentation and Viva-voce Examination (As per CBCS R.6.8.3)	30%
2.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to proceed for literature survey, synthesis and characterization of inorganic compounds/ materials using modern analytical and spectroscopic techniques and their study for various applications. They will be trained in research for pursuing higher studies. They will get training for working in

research in academic and industries.

Suggested References: Published research articles on given research topic.

On-line resources to be used if available as reference material
Published papers by reputed publishers like American Chemical Society, Royal Society of Chemistry, Wiley, Elsevier, etc.

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Master of Science, Inorganic Chemistry
M. Sc. Inorganic Chemistry, Semester – III

Course Code	PS03CINC58	Title of the Course	Comprehensive Viva
Total Credits of the Course	01	Hours per Week	01

Course Objectives:	To assess the overall knowledge of the student in the relevant subjects covered in core as well as elective courses.

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