VIGNAN'S
Foundation for Science, Technology & Research
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-Estd. u/s 3 of UGC Act 1956

DEPARTMENT OF CHEMISTRY

CIRCULAR

Date: 01.03.2023

The department of Chemistryis going to conduct Board of Studies (BoS) meeting for finalizing M.Sc. Chemistry and M.Sc. Organic Chemistry courses following R22 curriculumon **11.03.2023** from **9.00am**in blended mode. The physical meeting will be held at Office of Dean AS&H, 3rd Floor, A Block, VFSTR and the zoom link of thesame meeting in virtual mode (https://us06web.zoom.us/j/7644856231?pwd=N0Nkem4vRm16RUtYU1B0bjk2eHgwQT09)All the members are requested to make it convenient to attend the meeting.

The members are

1. Prof. KoyaPrabhakara Rao, Head, Dept. of Chemistry, VFSTR - Chairperson
2. Prof. G. Ranga Rao, Dept. of Chemistry, IIT Chennai, Tamil Nadu - External Member (Academic)
3. Prof. R. Balamurugam, School of Chemistry, University of Hyderabad, Telangana - External Member (Academic)
4. Dr. K. Suresh Babu, Senior Principle scientist, Natural Products Division, CSIR-IICT, Hyderabad, Telangana – External Member (Academic)
5. Prof. N. Srinivasu, Dean, Applied Science & Humanities (AS&H) and Professor, Dept. of Chemistry, VFSTR - Internal Member
6. Prof. N. Satyasree, Professor, Dept. of Chemistry, VFSTR - Internal Member
7. Prof. D. Nagaraju, Professor, Dept. of Chemistry, VFSTR - Internal Member
8. Dr. Shaik Anwar, Associate Professor, Dept. of Chemistry, VFSTR - Internal Member
9. Dr. M. Sireesha, Associate Professor, Dept. of Chemistry, VFSTR - Internal Member
10. Dr. Anandarup Goswami - Associate Professor, Dept. of Chemistry, VFSTR - Internal Member
11. Dr. V. Srinivasadesikan - Associate Dean, IQAC and Associated Professor, Dept. of Chemistry, VFSTR - Internal Member
12. Dr. Shubhalakshmi Sengupta, Scientist, Dept. of Chemistry, VFSTR - Internal Member
13. Dr. Ravi Kumar Kottalanka, Associate Professor, Dept. of Chemistry, VFSTR - Member Secretary

Agenda of the BoS Meeting:

1. To Discuss and finalize thedetailed syllabi of M.Sc. Chemistry and M.Sc. Organic Chemistrycourses offered by the Department of Chemistry related toupcoming R22 M.Sc. curriculum.The syllabi of the courses were previously discussed during Department Council (DC) meeting held on 27th January 2023 and the suggestions were also incorporated.
2. To approve thenecessary changes made into the syllabi of different courses of R22 curriculum offered by the Department of Chemistry for submission to the HoDs/Academic Council for further approval.

Chairperson

Department of Chemistry
Dt. 12/01/23
VFSTR University, Vadlamudi

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DEPARTMENT OF CHEMISTRY

Date: 11.03.2023

Minutes of Board of Studies Meeting

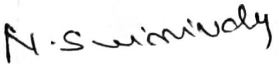
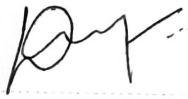
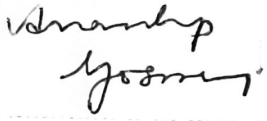
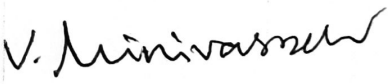
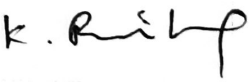
Board of Studies (BoS) meeting to finalize the courses offered by the Department of Chemistry for M.Sc. Chemistry and M.Sc. Organic Chemistryfollowing R22 curriculum was conducted on **11.03.2023**in blended mode from **9.00am to 1.00pm** in blended mode. The physical meeting was held at Office of Dean AS&H, 3rd Floor, A Block, VFSTR while some of the external committee members attended the meeting via virtual mode(zoomlink for the meeting: (https://us06web.zoom.us/j/7644856231?pwd=N0Nkem4vRm16RUtYU1B0bjk2eHgwQT09)

Agenda of the BoS Meeting:

1. To Discuss and finalize thedetailed syllabi of M.Sc. Chemistry and M.Sc. Organic Chemistry courses offered by the Department of Chemistry related to upcoming R22 M.Sc. curriculum.The syllabi of the courses were previously discussed during Department Council (DC) meeting held on 27th January 2023 and the suggestions were also incorporated.
2. To approve thenecessary changes made into the syllabi of different courses of R22 curriculum offered by the Department of Chemistry for submission to the HoDs/Academic Council for further approval.

The following members were present either thorough offline or online.

S. No.	Name and designation of the Member	Position	Signature
1.	Prof. KoyaPrabhakara Rao, Head, Dept. of Chemistry, VFSTR	Chairperson	
2.	Prof. G. Ranga Rao, Dept. of Chemistry, IIT Chennai, Tamil Nadu	External Member (Academic)	Attended online (Screenshot is attached)
3.	Prof. R. Balamurugam, School of Chemistry, University of Hyderabad, Telangana	External Member (Academic)	Attended online (Screenshot is attached)

S. No.	Name and designation of the Member	Position	Signature
4.	Dr. K. Suresh Babu, Senior Principle scientist, Natural Products Division, CSIR-IICT, Hyderabad, Telangana	External Member (Academic)	Attended online (Screenshot is attached)
5.	Prof. N. Srinivasu, Dean, Applied Science & Humanities (AS&H) and Professor, Dept. of Chemistry, VFSTR	Internal Member	
6.	Prof. N. Satyasree, Professor, Dept. of Chemistry, VFSTR	Internal Member	
7.	Prof. D. Nagaraju, Professor, Dept. of Chemistry, VFSTR	Internal Member	
8.	Dr. Shaik Anwar, Associate Professor, Dept. of Chemistry, VFSTR	Internal Member	
9.	Dr. M. Sireesha, Associate Professor, Dept. of Chemistry, VFSTR	Internal Member	
10.	Dr. Anandarup Goswami - Associate Professor, Dept. of Chemistry, VFSTR	Internal Member	
11.	Dr. V. Srinivasadesikan - Associate Dean, IQAC and Associated Professor, Dept. of Chemistry, VFSTR	Internal Member	
12.	Dr. Shubhalakshmi Sengupta, Scientist, Dept. of Chemistry, VFSTR	Internal Member	
13.	Dr. Ravi Kumar Kottalanka, Associate Professor, Dept. of Chemistry, VFSTR	Member Secretary	

Minutes of BoS meeting:

Chairperson Prof. KoyaPrabhakaraRao, Professor and Head, Dept. of Chemistry, VFSTR opened the meeting by welcoming and introducing the external members to the internal members. He briefly introduced *NEP 2020*and explained how the upcoming R22 M.Sc. curriculum at VFSTR complies with all the requirements emphasizingcontinuous learning and continuous assessment models, option for multiple entries and multiple exits etc. The member secretary then provided a clear picture about the proposed course structure and the differences from previous regulation. He then introduced the all the chemistry courses offered by the department, individually, underscored the modifications and seek suggestions from the committee members. In addition to the 17 core courses, 16 elective courses, 1 compulsory MOOC/NPTEL course, minimum 2 projects/internships spanning two semesters were also proposed(Appendix I and III).

The following points were discussed in the BoS meeting:

1. Regulation R22.
2. Curriculum structure with credits, credits distribution.
3. 2 Modules instead of 5 units.
4. Assessment methods (Formative & Summative).
5. Grading Schemes.
6. Electives and streams/pools.
7. Necessity of Mathematics related courses and Environmental Science based courses in M.Sc. curriculum.
8. Need of practical/project-oriented courses in M.Sc. curriculum.
9. Importance of branch specific chemistry core courses.
10. Requirement of branch specific advanced elective Chemistry courses.

Outcome ofthe discussion:

1. BoS Members (especially external members)appreciated the efforts taken by VFSTR to incorporate the features of NEP 2020 into R22 curriculum.They liked the regulations, assessment models, and the modular structure. With special regard to M.Sc. Chemistry and M.Sc. Organic Chemistry courses, they looked at the individual syllabi carefully and shred their valuable opinions. The course structure is provided in Appendix-I.
2. In comparison to previous R20 M.Sc. curriculum, major restructuring has taken place to make them more oriented towards continuous learning and assessment based on modular structure. In addition, special emphasis has been given to practical/project-centric curriculum.
3. Branch specific topics/courses have been included aiming towards skill development and employability (Appendices-II and III).
4. 17 core courses, 16 elective courses, 1 compulsory MOOC/NPTEL course, minimum 2 projects/internships spanning two semesters were proposed which make the curriculum unique, OBE-centric, student-friendly and application-oriented(Appendix-III).

The following resolutions made after the discussion:

1. Upon the incorporation of the fruitful suggestionsappropriately in the curriculum and syllabi of the regulation R22, the BoS members approved that the list of courses along with the detailed syllabicould be recommended to the HoDs/Academic Council of VFSTR for the approval.

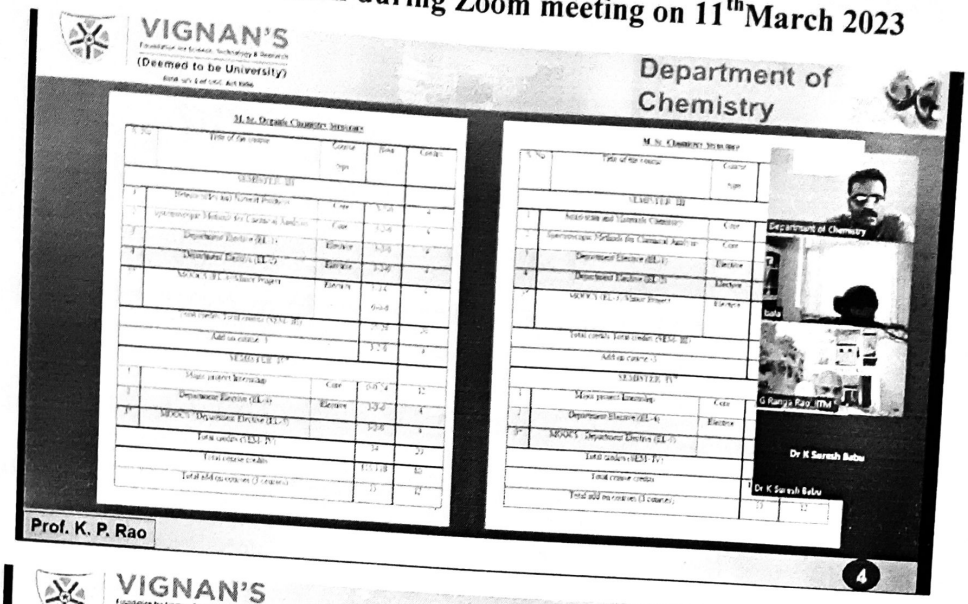
There being no further points for discussion, the Chairpersonthanked all the external, internal, invited members and announced that the meeting was adjourned.

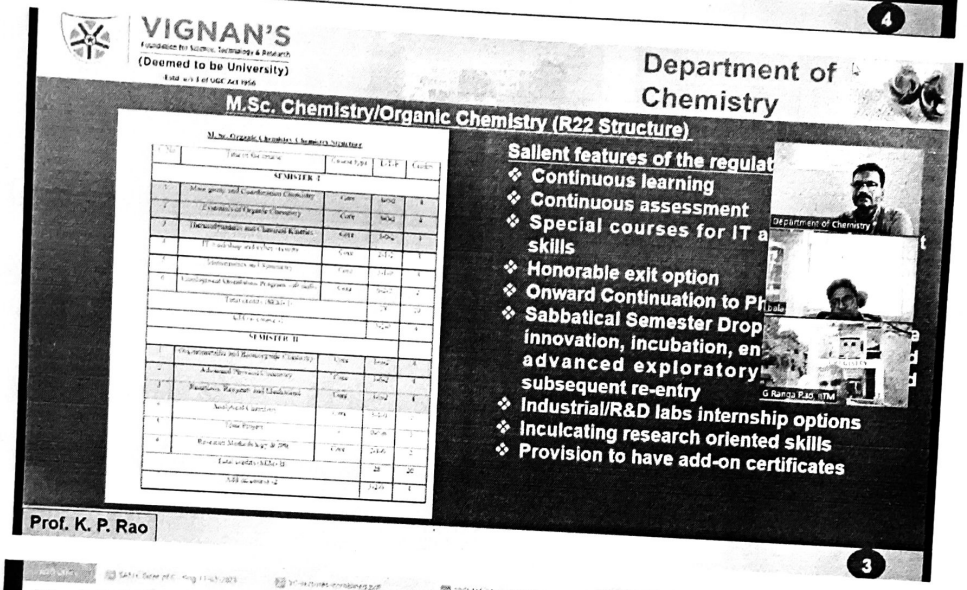
Member Secretary

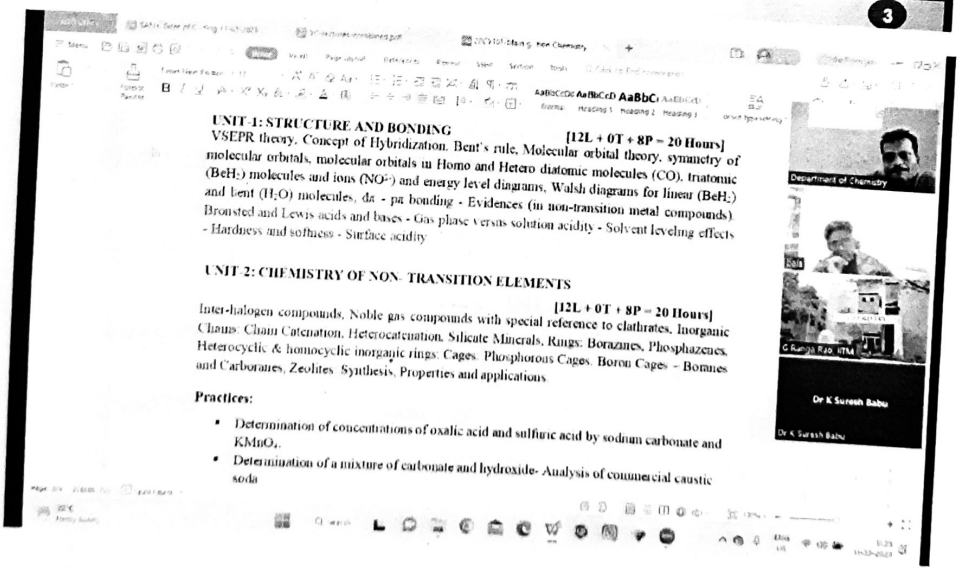
Chairperson

Department of Chemistry
Dt. 12/3/23
VFSTR University, Vadlamudi

The pictures taken during Zoom meeting on 11th March 2023







UNIT-1: STRUCTURE AND BONDING **[12L + 0T + 8P = 20 Hours]**

VSEPR theory, Concept of Hybridization, Bent's rule, Molecular orbital theory, symmetry of molecular orbitals, molecular orbitals in Homo and Hetero diatomic molecules (CO), triatomic (BeH_2) molecules and ions (NO^{2-}) and energy level diagrams, Walsh diagrams for linear (BeH_2) and bent (H_2O) molecules, dπ - pπ bonding - Evidences (in non-transition metal compounds). Bronsted and Lewis acids and bases - Gas phase versus solution acidity - Solvent leveling effects - Hardness and softness - Surface acidity

UNIT-2: CHEMISTRY OF NON- TRANSITION ELEMENTS

[12L + 0T + 8P = 20 Hours]

Inter-halogen compounds, Noble gas compounds with special reference to clathrates, Inorganic Chains: Chain Catenation, Heterocatenation, Silicate Minerals, Rings: Borazines, Phosphazenes, Heterocyclic & homocyclic inorganic rings: Cages: Phosphorous Cages, Boron Cages – Boranes and Carboranes, Zeolites: Synthesis, Properties and applications.

Practices:

- Determination of concentrations of oxalic acid and sulfuric acid by sodium carbonate and $KMnO_4$.
- Determination of a mixture of carbonate and hydroxide- Analysis of commercial caustic soda

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DEPARTMENT OF CHEMISTRY

APPENDIX I

Curriculum Structure of M.Sc. Chemistry and M.Sc. Organic Chemistry Courses

L=Lecture; T= Tutorial; P= Practical; C=Credits

General instructions

- for each semester, credits may be max. of **25 credits** and max. of **35 contact hours** including all courses. (must not exceed this in any case)
- NO courses are allowed with only L structure, all courses should be either L+T+P, L+P, L+T, T+P structure based on the credits. 1L=1 Credit, 2T or 2P=1 Credit.

M. Sc. Chemistry and M. Sc. Organic Chemistry courses for 1st and 2nd Semesters

S. No.	Title of the course	Course type	L-T-P	Credits
	SEMESTER – I			
1	Main group and Coordination Chemistry	Core	3-0-2	4
2	Essentials of Organic Chemistry	Core	3-0-2	4
3	Thermodynamics and Chemical Kinetics	Core	3-0-2	4
4	IT workshop and cyber security	Core	2-1-2	3
5	Mathematics and Symmetry	Core	3-1-0	3
6	Employment Orientation Program /Soft skills Laboratory (PET exam)	Core	0-2-2	2
	Total credits (SEM- I)		28	20
	Add-on course - 1		3-2-0	4
	SEMESTER – II			
1	Organometallic and Bioinorganic Chemistry	Core	3-0-2	4
2	Advanced Physical Chemistry	Core	3-0-2	4
3	Reactions, Reagents and Mechanism	Core	3-0-2	4
4	Analytical Chemistry	Core	3-1-0	3
5	Mini Project	-	0-1-5	3

6	Research Methodology & IPR	Core	1-2-0	2
	Total credits (SEM- II)		28	20
	Add-on course - 2		3-2-0	4

M. Sc. Chemistry courses for 3rd and 4th Semesters

S. No	Title of the course	Course type	L-T-P	Credits
	SEMESTER - III			
1	Solid-state and Materials Chemistry	Core	3-2-0	4
2	Spectroscopic Methods for Chemical Analysis	Core	3-2-0	4
3	Department Elective (EL-1)	Elective	3-2-0	4
4	Department Elective (EL-2)	Elective	3-2-0	4
5*	MOOCS (EL-3)/Minor Project	Elective	3-2-0/ 0-0-8	4
Total credits Total credits (SEM- III)			25/28	20
Add-on course - 3			3-2-0	4
	SEMESTER – IV#			
1	Major project/Internship	Core	0-0-24	12
2	Department Elective (EL-4)	Elective	3-2-0	4
3	MOOCS / Department Elective (EL-5)	Elective	3-2-0	4
Total credits (SEM- IV)			34	20
Total course credits			115/118	80
Total add on courses (3 courses)			15	12
#In online or offline mode.				

M. Sc. Organic Chemistry courses for 3rd and 4th Semesters

S. No	Title of the course	Course type	L-T-P	Credits
	SEMESTER - III			
1	Heterocycles and Natural Products	Core	3-2-0	4
2	Spectroscopic Methods for Chemical Analysis	Core	3-2-0	4
3	Department Elective (EL-1)	Elective	3-2-0	4
4	Department Elective (EL-2)	Elective	3-2-0	4
5	MOOCS (EL-3)/Minor Project	Elective	3-2-0/ 0-0-8	4
Total credits Total credits (SEM- III)			25/28	20
Add-on course -3			3-2-0	4
	SEMESTER – IV#			
1	Major project/Internship	Core	0-0-24	12

2	Department Elective (EL-4)	Elective	3-2-0	4
3	MOOCS / Department Elective (EL-5)	Elective	3-2-0	4
Total credits (SEM- IV)			34	20
Total course credits			115/118	80
Total add on courses (3 courses)			15	12
#In online or offline mode.				

Chairperson
Dt. 12/3/23

List of Elective Courses

S. No.	Title of the Elective	Course type
1	Advanced Organic Chemistry	(EL-1)
2	Environmental and Sustainable Chemistry	
3	Industrial Chemistry	
4	Nanomaterials and Heterogeneous Catalysis	
5	Advanced catalysis	(EL-2)
6	Characterization Methods for Materials	
7	Medicinal and Pharmaceutical Chemistry	
8	Polymer Science and Technology	
9	Advanced Spectroscopic Method for Organic Molecules	(EL-4)
10	Supramolecular and Metalorganic frame works (MOFs)	
11	Organic Materials and Carbon Nanomaterials	
12	Biological and Green Chemistry	
13	Stereo selective Organic Synthesis	(EL-5)
14	Fundamentals and applications of electrochemistry	
15	Computational Chemistry	
16	Surface and Interfacial Chemistry	

Chairperson
Dt. 12/3/23

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APPENDIX II

List of Courses that Enables Employability or Entrepreneurship or Skill Development

S. No.	Year and Semester	Branch(es)	Course Title	Employability / Entrepreneurship / Skill development
			Course Courses	
1.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	Main group and Coordination Chemistry	Skill development
2.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	Essentials of Organic Chemistry	Skill development
3.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	Thermodynamics and Chemical Kinetics	Skill development
4.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	IT workshop and cyber security	Entrepreneurship
5.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	Mathematics and Symmetry	Skill development
6.	I Year I Semester	M.Sc. Chem & M.Sc. Org. Chem	Employment Orientation Program /Soft skills Laboratory (PET exam)	Employability
7.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Organometallic and Bioinorganic Chemistry	Skill development
8.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Advanced Physical Chemistry	Skill development
9.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Reactions, Reagents and Mechanism	Skill development
10.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Analytical Chemistry	Skill development
11.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Mini Project	Skill development/Employability
12.	I Year II Semester	M.Sc. Chem & M.Sc. Org. Chem	Research Methodology & IPR	Entrepreneurship
13.	II Year III Semester	M.Sc. Chem	Solid-state and Materials Chemistry	Skill development
14.	II Year III Semester	M.Sc. Chem	Spectroscopic Methods for Chemical Analysis	Skill development
15.	II Year IV Semester	M.Sc. Chem	Major project/Internship	Skill development/Employability
16.	II Year III Semester	M.Sc. Org. Chem	Heterocycles and Natural Products	Skill development
17.	II Year III Semester	M.Sc. Org. Chem	Spectroscopic Methods for Chemical Analysis	Skill development

18.	II Year IV Semester	M.Sc. Org. Chem	Major project/Internship	Skill development/Employability
Open Elective Courses				
19.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Advanced Organic Chemistry	Skill development
20.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Environmental and Sustainable Chemistry	Skill development
21.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Industrial Chemistry	Skill development/employability
22.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Nanomaterials and Heterogeneous Catalysis	Skill development
23.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Advanced catalysis	Skill development
24.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Characterization Methods for Materials	Skill development/employability
25.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Medicinal and Pharmaceutical Chemistry	Skill development/employability
26.	II Year III Semester	M.Sc. Chem & M.Sc. Org. Chem	Polymer Science and Technology	Skill development
27.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Advanced Spectroscopic Method for Organic Molecules	Skill development/employability
28.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Supramolecular and Metalorganic frame works (MOFs)	Skill development
29.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Organic Materials and Carbon Nanomaterials	Skill development
30.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Biological and Green Chemistry	Skill development
31.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Stereo selective Organic Synthesis	Skill development
32.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Fundamentals and applications of electrochemistry	Skill development/employability
33.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Computational Chemistry	Skill development/employability
34.	II Year IV Semester	M.Sc. Chem & M.Sc. Org. Chem	Surface and Interfacial Chemistry	Skill development

General instructions

- If the percentage of change in the total course content is more than 20%, the course can be considered as NEW COURSE
- Core courses offered by other departments (i.e., S&H, computer courses) should also be included here if they satisfy the above criteria

Chairperson

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Dt. 12/5/23

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APPENDIX III

Comparison of Course Contents between R20 and R22 Curriculum

(Should be maintained by BoS member for future reference)

S. No.	Year and Semester	Course Title	% of Changes
Core Courses			
1	I Year I Semester	Main group and Coordination Chemistry	25
2	I Year I Semester	Essentials of Organic Chemistry	25
3	I Year I Semester	Thermodynamics and Chemical Kinetics	25
4	I Year I Semester	IT workshop and cyber security	NA (New course)
5	I Year I Semester	Mathematics and Symmetry	25
6	I Year I Semester	Employment Orientation Program /Soft skills Laboratory (PET exam)	NA (New course)
7	I Year II Semester	Organometallic and Bioinorganic Chemistry	25
8	I Year II Semester	Advanced Physical Chemistry	25
9	I Year II Semester	Reactions, Reagents and Mechanism	25
10	I Year II Semester	Analytical Chemistry	25
11	I Year II Semester	Mini Project	No change but credit changes
12	I Year II Semester	Research Methodology & IPR	50
13	II Year III Semester	Solid-state and Materials Chemistry	20
14	II Year III Semester	Spectroscopic Methods for Chemical Analysis	20
15	II Year IV Semester	Major project/Internship	No change but credit changes
16	II Year III Semester	Heterocycles and Natural Products	20
17	II Year III Semester	Spectroscopic Methods for Chemical Analysis	20
18	II Year IV Semester	Major project/Internship	No change but credit changes

Open Elective Courses			
19	II Year III Semester	Advanced Organic Chemistry	20
20	II Year III Semester	Environmental and Sustainable Chemistry	20
21	II Year III Semester	Industrial Chemistry	20
22	II Year III Semester	Nanomaterials and Heterogeneous Catalysis	25
23	II Year III Semester	Advanced catalysis	25
24	II Year III Semester	Characterization Methods for Materials	20
25	II Year III Semester	Medicinal and Pharmaceutical Chemistry	20
26	II Year III Semester	Polymer Science and Technology	20
27	II Year IV Semester	Advanced Spectroscopic Method for Organic Molecules	20
28	II Year IV Semester	Supramolecular and Metalorganic frame works (MOFs)	NA (New course)
29	II Year IV Semester	Organic Materials and Carbon Nanomaterials	20
30	II Year IV Semester	Biological and Green Chemistry	20
31	II Year IV Semester	Stereoselective Organic Synthesis	20
32	II Year IV Semester	Fundamentals and applications of electrochemistry	50
33	II Year IV Semester	Computational Chemistry	50
34	II Year IV Semester	Surface and Interfacial Chemistry	20
Average % of Changes			~35%

Chairperson

Department of Chemistry
Dt. 12/3/25
Vignan University, Vadlamudi