VIGNAN'S
FOUNDATION FOR SCIENCE, TECHNOLOGY & RESEARCH
(Deemed to be University) - Estd. u/s 3 of UGC Act 1956

DEPARTMENT OF CHEMISTRY

CIRCULAR

Date: 28.03.2025

Department of Chemistry is going to conduct Board of Studies (BoS) meeting for the 1st Year B. Tech (Chemistry and Environmental Studies) and M.Sc. Chemistry and M.Sc. Organic Chemistry programmes on **29.03.2025** from 9.00 AM in blended mode. The physical meeting will be held at Office of Dean AS&H, 3rd Floor, A Block, VFSTR. External BoS members and Invited members may join the meeting by using the following zoom link https://us06web.zoom.us/j/81451946560?pwd=Msdp0tONonrW4i0pkRYbtpBOAo304e.1. All the members are requested to make it convenient to attend the meeting.

The members are

1. Prof. K. Prabhakara Rao, HOD, Dept. of Chemistry, VFSTR - Chairperson
2. Prof. G. Ranga Rao, Department of Chemistry, IIT Madras - External Member (Academic)
3. Prof. P. Balamurugan, School of Chemistry, University of Hyderabad - External Member (Academic)
4. Dr. Ch. Ravi Kumar, Manager, AD synthesis Laurus Labs, Hyderabad - External Member (Industry)
5. Prof. K. Boomiraj, Department of Environmental Sciences, University Coimbatore – Invited Member (Academic)
6. Prof. N. Srinivasu, Dean SASH, VFSTR - Internal Member
7. Prof. D. Nagaraju, Dept. of Chemistry, VFSTR - Internal Member (Vignan off-Campus, Hyderabad)
8. Prof. N. Satya Sree, Dept. of Chemistry, VFSTR - Internal Member
9. Prof. Shaik Anwar, Dept. of Chemistry, VFSTR - Internal Member
10. Prof. Chandrasekar Kuppan, Dept. of Chemistry, VFSTR - Internal Member
11. Dr. Anandarup Goswami, Assoc. Prof., Dept. of Chemistry, VFSTR– Internal Member
12. Dr. M. V. K. Srivani, Assoc. Prof., Dept. of Chemistry, VFSTR– Internal Member
13. Dr. V. Srinivasadesiken, Assoc. Prof., Dept. of Chemistry, VFSTR– Internal Member
14. Dr. Sudip Mandal, Assist. Prof., Dept. of Chemistry, VFSTR - Nominee (Dean-R&D)
15. Dr. K. Mariadas, Assist. Prof., Dept. of Chemistry, VFSTR – Internal Member
16. Dr. N. Satya Vijaya Kumar, Assist. Prof., Dept. of Chemistry, VFSTR – Internal Member

17. Dr. M. Sireesha, Assoc. Prof. Dept. of Chemistry, VFSTR - Invitee
18. Dr Shubhalakshmi Sengupta, Assist. Prof., Dept. of Chemistry, VFSTR – Invitee
19. Dr. Y. S. L. V. Narayana, Assist. Prof., Dept. of Chemistry, VFSTR – Invitee
20. Dr. Tejaswani, Assist. Prof. Dept. of Chemistry, VFSTR – Invitee
21. Dr. Ravi Kumar Kottalanka, Assoc. Prof., Dept. of Chemistry, VFSTR - Member Secretary

Agenda of the BoS Meeting:

1. To discuss and finalize the curriculum structure and detailed syllabus of Basic Sciences courses such as Engineering Chemistry, Organic Chemistry, Environmental Studies, and other open elective courses for the B.Tech. and Diploma programmes, as per the R25 (C25) regulations and AICTE guidelines, respectively.
2. To approve the R25 curriculum structure and syllabus for the 1st Year B.Tech., M.Sc. Chemistry, and M.Sc. Organic Chemistry programmes, and recommend them to the Academic Council.
3. To discuss and finalize the elective courses list (Department/ Open/ Minor) and stream of B.Tech., M.Sc Programme for the regulation R25-C25.
4. To discuss about the SDG's and IKS components in the syllabus.
5. Any other points with the permission of Chairperson.

Member Secretary

Chairperson

Department of Chemistry
VFSTR University

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DEPARTMENT OF CHEMISTRY

Date: 29.03.2025

Minutes of Board of Studies Meeting

The Board of Studies (BoS) meeting for the B.Tech., M.Sc. Chemistry, and M.Sc. Organic Chemistry programmes was held on **29th March 2025** in **blended mode**, from **9:00 AM to 1:00 PM**. The physical meeting took place at the **Office of the Dean, AS&H, 3rd Floor, A Block, VFSTR**. External BoS members and invited members joined the meeting virtually via the Zoom link: **https://us06web.zoom.us/j/81451946560?pwd=Msdp0tONonrW4i0pkRYbtpBOAo304e.1**
All internal members and other invited members attended the meeting **in person**

Agenda of the BoS Meeting:

1. To discuss and finalize the curriculum structure and detailed syllabus of Basic Sciences courses such as Engineering Chemistry, Organic Chemistry, Environmental Studies, and other open elective courses for the B.Tech. and Diploma programmes, as per the R25 (C25) regulations and AICTE guidelines, respectively.
2. To approve the R25 curriculum structure and syllabus for the 1st Year B.Tech., M.Sc. Chemistry, and M.Sc. Organic Chemistry programmes, and recommend them to the Academic Council.
3. To discuss and finalize the elective courses list (Department/ Open/ Minor) and stream of B.Tech., M.Sc Programme for the regulation R25-C25.
4. To discuss about the SDG's and IKS components in the syllabus.
5. Any other points with the permission of Chairperson.

The following members were present either through offline or online.

S.No.	Name and Designation of the Member	Position	Signature
1.	Prof. K. Prabhakara Rao, Head, Dept. of Chemistry, VFSTR	Chairperson	
2.	Prof. G. Ranga Rao, Department of Chemistry, IIT Madras	External Member (Academic)	Online
3.	Prof. P. Balamurugan, School of Chemistry, University of Hyderabad	External Member (Academic)	Online
4.	Dr. Ch. Ravi Kumar, Manager, AD synthesis Laurus Labs, Hyderabad	External Member (Industry)	Online
5.	Prof. K. Boomiraj, Department of Environmental Sciences, University Coimbatore	Invited Member (Academic)	Online
6.	Prof. N. Srinivasu, Dean SASH, VFSTR	Internal Member	
7.	Prof. D. Nagaraju, Dept. of Chemistry, VFSTR	Internal Member (Vignan off-Campus, Hyderabad)	
8.	Prof. N. Satya Sree, Dept. of Chemistry, VFSTR	Internal Member	
9.	Prof. Shaik Anwar, Dept. of Chemistry, VFSTR	Internal Member	
10.	Prof. Chandrasekar Kuppan, Dept. of Chemistry, VFSTR	Internal Member	
11.	Dr. Anandarup Goswami, Assoc. Prof., Dept. of Chemistry, VFSTR	Internal Member	
12.	Dr. M. V. K. Srivani, Assoc. Prof., Dept. of Chemistry, VFSTR	Internal Member	
13.	Dr. V. Srinivasadesiken, Assoc. Prof., Dept. of Chemistry, VFSTR	Internal Member	
14.	Dr. Sudip Mandal, Assist. Prof., Dept. of Chemistry, VFSTR	Nominee (Dean-R&D)	
15.	Dr. N. Satya Vijaya Kumar, Assist. Prof., Dept. of Chemistry, VFSTR	Internal Member	
16.	Dr Shubhalakshmi Sengupta, Assist. Prof., Dept. of Chemistry, VFSTR	Invitee	
17.	Dr. Tejaswani, Assist. Prof. Dept. of Chemistry, VFSTR – Invitee	Invitee	
18.	Dr. Ravi Kumar Kottalanka, Assoc. Prof., Dept. of Chemistry, VFSTR	Member Secretary	

The following members have taken leave of absence:

1. Dr. K. Mariadas, Assist. Prof., Dept. of Chemistry, VFSTR – Internal Member
2. Dr. M. Sireesha, Assoc. Prof. Dept. of Chemistry, VFSTR – Invitee
3. Dr. Y. S. L. V. Narayana, Assist. Prof., Dept. of Chemistry, VFSTR – Invitee

Chairperson Prof. Koya Prabhakara Rao, Head, Department of Chemistry, VFSTR opened the meeting by welcoming and introducing the external members, invitees to the internal members. Chairperson presented about the *NEP 2020 Compliant Regulation - R25(C25)* which emphasis on creating *learning centric* (continuous learning and continuous assessment model), offering various B.Tech., M.Sc. Chemistry and M.Sc. Organic Chemistry programmes.

The following points were discussed in the BoS meeting:

1. Regulation R25-C25.
2. Curriculum structure with credits, credits distribution (L-T-P-SL).
3. Significance of self-learning (SL)
4. 2 Modules, Module-1 is fundamental with 2 units and Module-2 is advanced topics with 3 units.
5. Assessment methods (Formative & Summative).
6. Grading Schemes.
7. Matrix for identifying slow learners and advanced learners
8. Department Elective (streams/pools).
9. Open Elective and Minor courses (streams/pools).
10. Information related to NPTEL courses for the Academic Year 2025-26.
11. Creative work-in-Lieu-Course work
12. SDG Mapping and incorporation of IKS components
13. Consideration of new program outcomes (POs) as prescribed by the NBA

The following resolutions made after the discussion:

1. BoS Members approved the revised regulations, curriculum structure, syllabus of B.Tech., and M.Sc. Chemistry and M.Sc. Organic Chemistry programmes and it follows based on the NEP 2020. Curriculum structure is provided in **Appendix - I**.
2. Major restructuring has taken place in the curriculum which is oriented towards continuous learning and assessment based on Module structure.
3. Major reformation has taken place in the curriculum by offering pre-semester and Add-on-certifications courses thorough 12 more credits with additional courses.
4. The curriculum is encompassing the courses that enable employability or entrepreneurship or skill development, provided in **Appendix - II**.
5. Total average percentage of syllabus revised was **30%** compared to previous curriculum provided in **Appendix - III**.

6. The significant changes are made in the content of all courses and hence the courses are considered as new courses provided in **Appendix - IV**.

Based on the feedback from various stakeholders and suggestions given by the members, the Chairperson of BoS told that, those fruitful suggestions would be incorporated appropriately in the curriculum and syllabi of the regulation R25 and this will be recommended to the Academic Council of VFSTR for the approval.

The following action points were pronounced during the BoS minutes. (**Appendix - V**)

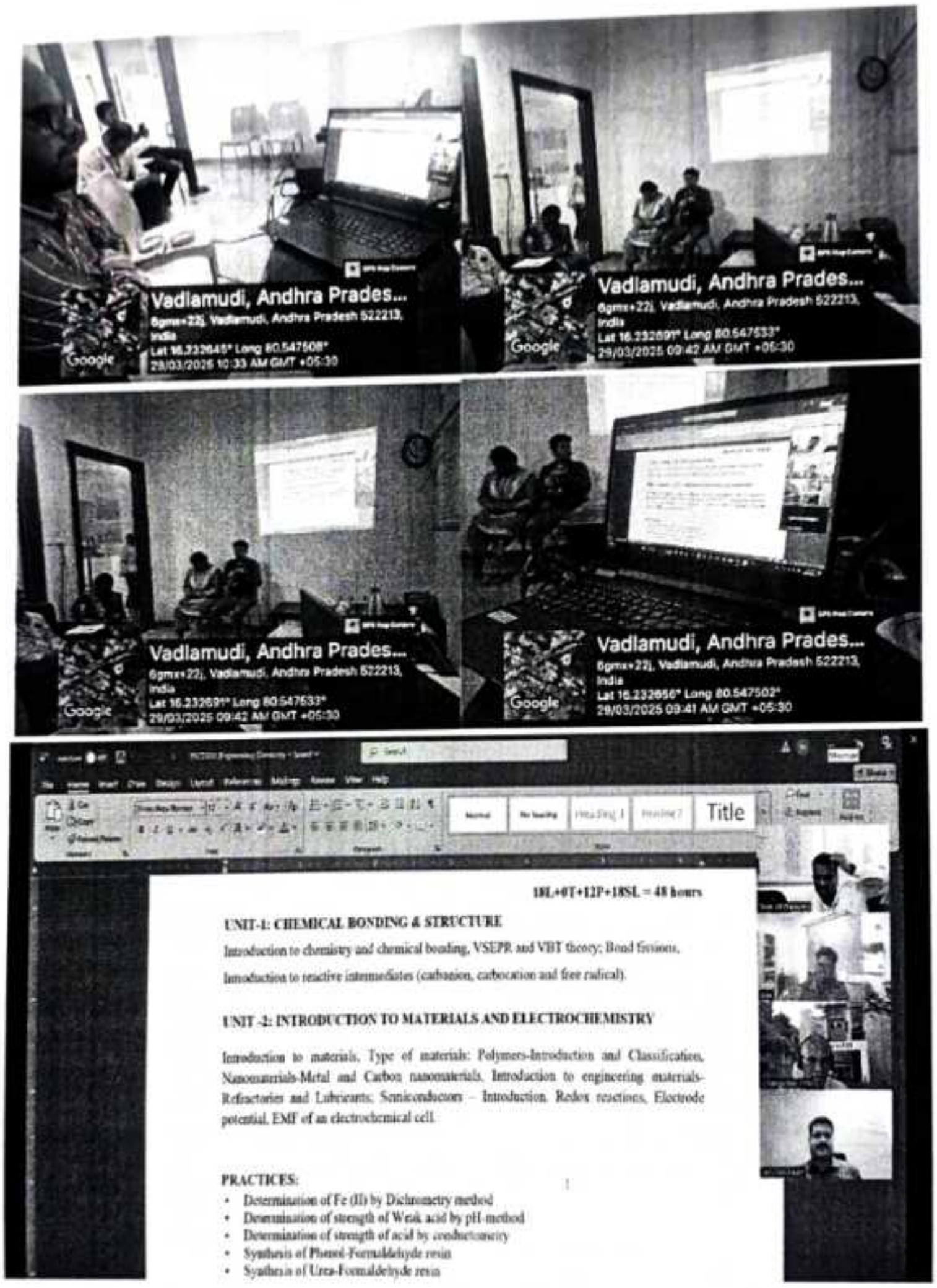
1. Incorporation of BoS members suggested changes in the each individual course content of B.Tech and M.Sc Programmes.
2. Those who secured less than or equal to 45% score in various internal assessment tests such as surprise test, MCQ, online quiz, seminar presentations, answering module bank questions etc. are considered as slow learners.
3. Those who secured greater than or equal to 85% score in various internal assessment tests as mentioned above are considered as advanced learners.
4. Encourage the post graduate students to register for Swayam NPTEL/MOOC courses by providing credit weightage to add-on-credits to add-on-certification degree.
5. Proposed Minor course structure (from Environmental studies) was approved with minor suggestions in the course content.

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

Member Secretary

Chairperson

Geotagged Photos during the BoS Meeting



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DEPARTMENT OF CHEMISTRY

APPENDIX I

M.Sc. Chemistry & M.Sc. Organic Chemistry Programmes: Curriculum Structure

Pre - Semester (Common to both M.Sc. Chemistry and M.Sc. Organic Chemistry)

Course Code	Title of the course	L	T	P	C	Course type
	Orientation Session	0	2	0	1	Binary graded
	IT workshop and cyber security	0	0	2	1	Binary graded
	English Communication Skills	0	2	0	1	Binary graded
	Chemistry	0	2	0	1	Professional Core
	Total				4	

I Year I Semester (Common to both M.Sc. Chemistry and M.Sc. Organic Chemistry)

Course Code	Title of the course	L	T	P	C	Course type
	Main group and Coordination Chemistry	3	0	2	4	Professional Core
	Essentials of Organic Chemistry	3	0	2	4	Professional Core
	Thermodynamics and Chemical Kinetics	3	0	2	4	Professional Core
	Mathematics and Symmetry	3	1	0	3	Professional Core
	Teaching Assistantship	0	0	2	1	Binary graded
	Indian Knowledge Systems	0	2	0	1	Binary graded
	Work-in-lieu of a course*				2	Elective / Floating Credit
	Sub Total				19	
	Add on course -1				4	
	Total				23	

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APPENDIX I

M.Sc. Chemistry & M.Sc. Organic Chemistry Programmes: Curriculum Structure

I Year II Semester (Common to both M.Sc. Chemistry and M.Sc. Organic Chemistry)

Course Code	Title of the course	L	T	P	C	Course type
	Organometallic and Bioinorganic Chemistry	3	0	2	4	Professional Core
	Advanced Physical Chemistry	3	0	2	4	Professional Core
	Reactions, Reagents and Mechanism	3	0	2	4	Professional Core
	Analytical Chemistry	3	1	0	3	Professional Core
	Mini Project/Field Project	0	0	6	2	Project
	Research Methodology & IPR	1	2	0	2	Interdisciplinary
	Teaching Assistantship	0	0	2	1	Binary graded
	Sub Total				**20**	
	Add on course -2				**4**	
	Total				**24**	

II Year I Semester (M.Sc. Organic Chemistry)

Course Code	Title of the course	L	T	P	C	Course type
	Heterocycles and Natural Products	3	2	0	4	Professional Core
	Spectroscopic Methods for Chemical Analysis	3	2	0	4	Professional Core
	Department Elective (EL-1)	3	2	0	4	Elective
	Department Elective (EL-2)	3	2	0	4	Elective
	MOOCS/minor Project	0	0	4	2	Elective
	Sub Total				**18**	
	Add on course -3				**4**	
	Total				**22**	

II Year I Semester (M.Sc. Chemistry)

Course Code	Title of the course	L	T	P	C	Course type
	Solid-state and Materials Chemistry	3	2	0	**4**	Professional Core
	Spectroscopic Methods for Chemical Analysis	3	2	0	**4**	Professional Core
	Department Elective - 1	3	2	0	**4**	Elective
	Department Elective - 2	3	2	0	**4**	Elective
	Elective-3/MOOCS/Project	0	0	4	**2**	Elective
	Sub Total	12	08	04	**18**	
	Add on course -3				**4**	
	Total				**22**	

II Year II Semester

Course Code	Title of the course	L	T	P	C	Course type
	Internship/Major Project	0	0	24	12	Project
	Department Elective - 4	3	2	0	4	Elective
	MOOCS / Department Elective - 5	3	2	0	3	Elective
	Total				**19**	

IV. List of SWAYAM - NPTEL Courses

S.No	Course Name with NPTEL Code	NPTEL Course Offered by	Credits
1.	NPTEL Code: Medicinal and Pharmaceutical Chemistry	IIT, Madras	3
2.	NPTEL Code: Modern Organic Synthetic Methods	IIT, Delhi	3
3.	NPTEL Code: Total Synthesis'	IIT, Bombay	3
4.	NPTEL Code: Machine Learning in Catalysis	IIT, Kharagpur	3

Member Secretary

Chairperson

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APPENDIX I

I. I Year I Semester/ II Semester – B. Tech/B. Sc – Basic Sciences Course Structure

S. No.	Course Code	Course Title	L	T	P	SL	C	Remarks	Course Offered By
	25CTXXX	Engineering Chemistry	3	-	2	3	4	Basic Sciences	Dept. of Chemistry, SASH
	25CTXXX	Organic Chemistry	3	-	2	3	4	Basic Sciences	Dept. of Chemistry, SASH
	25CTXXX	Environmental Studies (for B.Tech)	2	2	0	2	3	Basic Sciences	Dept. of Chemistry, SASH
	25CTXXX	Environmental Studies (for B.Sc)	0	1	1	1	1	Basic Sciences	Dept. of Chemistry, SASH

L=Lecture; T= Tutorial; P= Practical; SL= Self Learning; C=Credits

- NO courses are allowed with only L or T structure, all courses should be either L+T+P, L+P, L+T, T+P, P structure based on the credits. 1L=1 Credit, 2T or 2P=1 Credit.

II. List of Minor Course: Environment for Engineers

S. No.	Course Code	Course Title	L	T	P	SL	C	Name of the Stream (if available)
1.		Waste Management, Environmental Toxicology & Public Health	3	2	0	3	4	Stream-1
2.		Green Chemistry	3	2	0	3	4	Stream-1
3.		Sustainability and Climate Change Mitigation	3	2	0	3	4	Stream-2
4.		Emerging Energy Applications	3	2	0	3	4	Stream-2

III. List of Open Elective Courses

S. No.	Course Code	Course Title	L	T	P	SL	C
1.	25CTXXX	Chemistry for Emerging Technologies	2	2	0	2	3
2.	25CTXXX	Nanoscience and Technology	2	2	0	2	3
3.	25CTXXX	Electronic and Optoelectronic Polymers	2	2	0	2	3
4.	25CTXXX	Chemistry in Daily Lives	2	2	0	2	3
5.	25CTXXX	Electrochemical Energy conversion and Storage	2	2	0	2	3
6.	25CTXXX	Nanobiotechnology	2	2	0	2	3
7.	25CTXXX	Bioremediation Technologies for Environmental Pollutants	2	2	0	2	3
8.	25CTXXX	Organic and Nanomaterials for Electronic and Optical Properties	2	2	0	2	3
9.	25CTXXX	Computational Chemistry	2	2	0	2	3
10.	25CTXXX	Circular Economy for Sustainable Built Environment	2	0	2	2	3

Member Secretary

Chairperson

Dt.....

Department of Chemistry
VFSTR University, Vadlamudi

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APPENDIX II

List of Courses that Enables Employability or Entrepreneurship or Skill Development

M.Sc Chemistry and M.Sc. Organic Chemistry Programmes

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
1		Main group and Coordination Chemistry	2025	Skill development
2		Essentials of Organic Chemistry	2025	Skill development
3		Thermodynamics and Chemical Kinetics	2025	Skill development
4		Mathematics and Symmetry	2025	Skill development
		IT workshop and cyber security	2025	Skill development
		English Communication Skills	2025	Employability
		Indian Knowledge Systems	2025	Skill development
5		Organometallic and Bioinorganic Chemistry	2025	Skill development
6		Advanced Physical Chemistry	2025	Skill development
7		Reactions, Reagents and Mechanism	2025	Skill development
8		Analytical Chemistry	2025	Skill development
9		Mini Project/Field Project	2022	Employability
10		Research Methodology & IPR	2025	Entrepreneurship
11		Heterocycles and Natural Products	2025	Skill development
12		Spectroscopic Methods for Chemical Analysis	2025	Skill development
13		Solid-state and Materials Chemistry	2025	Skill development
14		Spectroscopic Methods for Chemical Analysis	2025	Skill development
15		Internship/Major Project	2025	Employability
16		Advanced Organic Chemistry	2025	Skill development
17		Environmental and Sustainable Chemistry	2025	Skill development
18		Industrial Chemistry - Food, Agro and pharmaceutical –Chemistry	2025	Skill development/ Employability
19		Nanomaterials and Heterogeneous Catalysis	2025	Skill development
20		Advanced catalysis	2025	Skill development

21		Characterization Methods for Materials	2025	Skill development/ Employability
22		Medicinal and Pharmaceutical Chemistry	2025	Skill development/ Employability
23		Polymers and Elastomers	2025	Skill development
24		Modern Organic Synthetic Methods	2025	Skill development
25		Total Synthesis`	2025	Skill development
26		Machine Learning in Catalysis	2025	Skill development/ Employability
27		Advanced Analytical Methods in Chemistry	2025	Skill development/ Employability
28		Advanced Spectroscopic Method for Organic Molecules	2025	Skill development/ Employability
29		Supramolecular and Metalorganic frame works (MOFs)	2025	Skill development
30		Organic Materials and Carbon Nanomaterials	2025	Skill development
31		Biological and Green Chemistry	2025	Skill development
32		Stereo selective Organic Synthesis	2025	Skill development
33		Fundamentals and applications of electrochemistry	2025	Skill development/ Employability
34		Computational Chemistry	2025	Skill development/ Employability
35		Surface and Interfacial Chemistry	2025	Skill development

B.Tech. – Chemistry & Environmental Studies Courses

S. No.	Course Code	Course Title	Year of Introduction	Employability / Entrepreneurship / Skill development
36		Engineering Chemistry	2025	Skill development
37		Organic Chemistry	2025	Skill development
		Environmental Studies (for B.Tech)	2025	Skill development
38		Environmental Studies (for B.Sc)	2025	Skill development
39		Analytical Chemistry	2025	Skill development/ Employability
Open Elective Courses				
40		Chemistry for Emerging Technologies	2025	Skill development/ Employability
41		Nanoscience and Technology	2025	Skill development/ Employability
42		Electronic and Optoelectronic Polymers	2025	Skill development/ Employability
43		Chemistry in Daily Lives	2025	Skill development/ Employability
44		Electrochemical Energy conversion and Storage	2025	Skill development/ Employability

45		Nanobiotechnology	2025	Skill development/ Employability
46		Bioremediation Technologies for Environmental Pollutants	2025	Skill development/ Employability
47		Organic and Nanomaterials for Electronic and Optical Properties	2025	Skill development/ Employability
48		Computational Chemistry	2025	Skill development/ Employability
49		Circular Economy for Sustainable Built Environment	2025	Skill development/ Employability
Minor Course: Sustainable Development Studies				
50		Waste Management, Environmental Toxicology & Public Health	2025	Skill development/ Employability
51		Green Chemistry	2025	Skill development/ Employability
52		Sustainability and Climate Change Mitigation	2025	Skill development/ Employability
53		Emerging Energy Applications	2025	Skill development/ Employability

Member Secretary

Chairperson

Dt.....

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APPENDIX III

Comparison of Course Contents between R22 (C24) and R25-C25 Curriculums

B.Tech. – Chemistry & Environmental Studies Courses

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
1.	25CTXXX	Engineering Chemistry	35%	Justification attached as separate sheet
2.	25CTXXX	Organic Chemistry	10%	
3.	25CTXXX	Environmental Studies (for B.Tech.)	35%	
4.	25CTXXX	Environmental Studies (for B.Sc.)	30%	Module 2 is changed with applications and case studies
5.	25CTXXX	Analytical Chemistry	0%	No change is required
Open Elective Courses				
6.	25CTXXX	Chemistry for Emerging Technologies	0%	No change is required
7.	25CTXXX	Nanoscience and Technology	0%	No change is required
8.	25CTXXX	Electronic and Optoelectronic Polymers	0%	No change is required
9.	25CTXXX	Chemistry in Daily Lives	0%	No change is required
10.	25CTXXX	Electrochemical Energy conversion and Storage	0%	No change is required
11.	25CTXXX	Nanobiotechnology	0%	No change is required
12.	25CTXXX	Bioremediation Technologies for Environmental Pollutants	0%	No change is required
13.	25CTXXX	Organic and Nanomaterials for Electronic and Optical Properties	0%	No change is required
14.	25CTXXX	Computational Chemistry	0%	No change is required
15.	25CTXXX	Circular Economy for Sustainable Built Environment	0%	No change is required
Minor Course: Sustainable Development Studies				
16.	25CTXXX	Waste Management, Environmental Toxicology & Public Health	100%	New Course
17.	25CTXXX	Green Chemistry	100%	New Course
18.	25CTXXX	Sustainability and Climate Change Mitigation	100%	New Course
19.	25CTXXX	Emerging Energy Applications	100%	New Course

S. No.	Course Code	Course Title	% of Changes	Justification for the changes
20.	25CTXXX	Main group and Coordination Chemistry	35%	Restructured the Module 1 and Module 2 contents. Few new topics were added in Module 2 content.
21.	25CTXXX	Essentials of Organic Chemistry	15%	No major changes, slight modifications in each unit content with more examples.
22.	25CTXXX	Thermodynamics and Chemical Kinetics	20%	Module 1 and Module 2 contents were restructured with numerical problems and applications.
23.	25CTXXX	Mathematics and Symmetry	20%	Module 2 is changed with applications and case studies
24.	25CTXXX	IT workshop and cyber security	0%	No change is required
25.	25CTXXX	English Communication Skills	100%	Based on the industrial needs this course is included
26.	25CTXXX	Indian Knowledge Systems	100%	New course
27.	25CTXXX	Organometallic and Bioinorganic Chemistry	20%	Module 1 and 2 contents were restructured and few new examples were added in each unit.
28.	25CTXXX	Advanced Physical Chemistry	20%	Module 1 and Module 2 contents were restructured with numerical problems and applications.
29.	25CTXXX	Reactions, Reagents and Mechanism	15%	No major changes, slight modifications in each unit content with more examples.
30.	25CTXXX	Analytical Chemistry	15%	Module 2 is changed with applications and case studies
31.	25CTXXX	Mini Project/Field Project	0%	No change is required
32.	25CTXXX	Research Methodology & IPR	0%	No change is required
33.	25CTXXX	Heterocycles and Natural Products	40%	One new Unit 1 was added in Module 1 content and Module 2 contents were slightly modified.
34.	25CTXXX	Spectroscopic Methods for Chemical Analysis	20%	No major changes, slight modifications in each unit content with more examples.
35.	25CTXXX	Solid-state and Materials Chemistry	20%	No major changes, slight modifications in each unit content with more examples.
36.	25CTXXX	Spectroscopic Methods for Chemical Analysis	20%	No major changes, slight modifications in each unit content with more examples.
37.	25CTXXX	Internship/Major Project	0%	No change is required

38.	25CTXXX	Advanced Organic Chemistry	25%	Course contents were restructured with advanced organic transformations.
39.	25CTXXX	Environmental and Sustainable Chemistry	20%	No much changes in course contents, re-arranged the course content as per R25 format with some recent case studies.
40.	25CTXXX	Industrial Chemistry - Food, Agro and pharmaceutical –Chemistry	10%	No much changes in course contents, re-arranged the course content as per R25 format with some recent case studies.
41.	25CTXXX	Nanomaterials and Heterogeneous Catalysis	10%	No much changes in course contents, re-arranged the course content as per R25 format
42.	25CTXXX	Advanced catalysis	35%	One new unit was added in Module 1 and Module 2 contents were re-structured with recent examples.
43.	25CTXXX	Characterization Methods for Materials	10%	No much changes in course contents, re-arranged the course content as per R25 format
44.	25CTXXX	Medicinal and Pharmaceutical Chemistry	100%	New course
45.	25CTXXX	Polymers and Elastomers	10%	No much changes in course contents, re-arranged the course content as per R25 format
46.	25CTXXX	Modern Organic Synthetic Methods	100%	New course
47.	25CTXXX	Total Synthesis`	100%	New course
48.	25CTXXX	Machine Learning in Catalysis	100%	New course
49.	25CTXXX	Advanced Analytical Methods in Chemistry	100%	New course
50.	25CTXXX	Advanced Spectroscopic Method for Organic Molecules	15%	No much changes in course contents, re-arranged the course content as per R25 format
51.	25CTXXX	Supramolecular and Metalorganic frame works (MOFs)	10%	No much changes in course contents, re-arranged the course content as per R25 format
52.	25CTXXX	Organic Materials and Carbon Nanomaterials	15%	Both module 1 and 2 course contents were restructured with advanced applications in nanoscience and technology.
53.	25CTXXX	Biological and Green Chemistry	10%	No much changes in course contents, re-arranged the course content as per R25 format

54.	25CTXXX	Stereo selective Organic Synthesis	15%	No much changes in course contents, re-arranged the course content as per R25 format
55.	25CTXXX	Fundamentals and applications of electrochemistry	15%	No much changes in course contents, re-arranged the course content as per R25 format
56.	25CTXXX	Computational Chemistry	10%	No much changes in course contents, re-arranged the course content as per R25 format
57.	25CTXXX	Surface and Interfacial Chemistry	25%	In R25, Surface and Interfacial Chemistry includes advanced adsorption models, applications, and modern surface characterization techniques.

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Chairperson

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APPENDIX IV

List of New Courses in the R22-C24 Curriculum

B.Tech. – Chemistry & Environmental Studies Courses

S. No.	Course Code	Course Title	% of Change	Justification for the Changes
1.	25CTXXX	Engineering Chemistry	35%	Justification attached as separate sheet
2.	25CTXXX	Environmental Studies (for B.Tech.)	35%	
3.	25CTXXX	Environmental Studies (for B.Sc.)	30%	Module 2 is changed with applications and case studies
4.	25CTXXX	Waste Management, Environmental Toxicology & Public Health	100%	New Course
5.	25CTXXX	Green Chemistry	100%	New Course
6.	25CTXXX	Sustainability and Climate Change Mitigation	100%	New Course
7.	25CTXXX	Emerging Energy Applications	100%	New Course
8.	25CTXXX	Main group and Coordination Chemistry	35%	Restructured the Module 1 and Module 2 contents. Few new topics were added in Module 2 content.
9.	25CTXXX	English Communication Skills	100%	Based on the industrial needs this course is included
10.	25CTXXX	Indian Knowledge Systems	100%	New course
11.	25CTXXX	Heterocycles and Natural Products	40%	One new Unit 1 was added in Module 1 content and Module 2

				contents were slightly modified.
12.	25CTXXX	Advanced catalysis	35%	One new unit was added in Module 1 and Module 2 contents were re-structured with recent examples.
13.	25CTXXX	Advanced Organic Chemistry	25%	Course contents were restructured with advanced organic transformations.
14.	25CTXXX	Medicinal and Pharmaceutical Chemistry	100%	New course
15.	25CTXXX	Modern Organic Synthetic Methods	100%	New course
16.	25CTXXX	Total Synthesis	100%	New course
17.	25CTXXX	Machine Learning in Catalysis	100%	New course
18.	25CTXXX	Advanced Analytical Methods in Chemistry	100%	New course
19.	25CTXXX	Surface and Interfacial Chemistry	25%	In R25, Surface and Interfacial Chemistry includes advanced adsorption models, applications, and modern surface characterization techniques.

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General instructions

- This table should be prepared from Appendix – III.
- If the percentage of change in the total course content is more than 20%, then the course can be considered as **NEW COURSE**.
- Core courses offered by other departments (i.e. S&H, Management, computer courses) also included in this table, if they satisfy the above criteria.
- If any new course is added, then keep as 100%.

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Comparison of R22 vs R25 Syllabus

Engineering Chemistry

Module/ Unit	Topic /Area	R22 Syllabus	R25 Syllabus	Change Type	% Revised
Module 1/Unit 1	Chemical Bonding & Intermediates	Not Available In R22	Chemical bonding (VSEPR, VBT), reactive intermediates	New	100%
Module 1/Unit 2	Materials + Electrochemistry Intro	Polymers, nanomaterials, semiconductors, redox, EMF	Electrochemistry, polymers, nanomaterials retained but reorganized	Partial revision	40%
Module 2/Unit 3	Polymer Chemistry	Polymer types, PE, Nylon-6,6, elastomers, conducting polymers	Added conduction mechanism & biodegradable polymers	Expanded	30%
Module 2/Unit 4	Electrochemical Devices	Lead-acid, Li-ion, H2-O2 fuel cells	Same, but added Agastya Samhita	Minor update	10%
Module 2/Unit 5	Nanomaterials	Graphene synthesis, green synthesis	Added carbon nanotubes	Partial revision	30%
Module 2/Unit 5	Electronics & Optoelectronics	OLEDs, memory devices, P3HT, computational chemistry	OLEDs and computational chemistry removed, memory devices simplified	Moderate revision	50%
Module 2/Unit 5	Engineering Materials	Refractories, lubricants	Same content	Unchanged	0%

Approximately 37% of the Engineering Chemistry syllabus was revised in the transition from R22 to R25.

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Comparison of R22 vs R25 Syllabus

Organic Chemistry

Module / Unit	Topic	Change Summary R22 to R25	% Revised
Module 1 – Unit 1	Chemical Bonding & Intermediates	No changes; bonding theories and intermediates remain the same	0%
Module 1 – Unit 2	Stereochemistry	Same content; added BINOL synthesis and IKS relevance	10%
Module 1 – Practices	Melting/Boiling points, TLC, BINOL	Removed Aldol; retained others; IKS emphasis on stereochemistry	15%
Module 2 – Unit 1	Organic Reactions & Mechanisms	Mostly unchanged; added clearer reference to catalytic hydrogenation	10%
Module 2 – Unit 2	Spectroscopy (IR, NMR, MS)	No changes; examples and coverage remain the same	0%
Module 2 – Practices	Aspirin synthesis, IR, $KMnO_4$, $NaBH_4$, etc.	Removed steam distillation; added dibenzalacetone and enhanced analysis practices	25%

Approximately 10% of the Organic Chemistry syllabus was revised in the transition from R22 to R25.

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Comparison of R22 vs R25 Syllabus

Environmental Studies for B. Tech all branches

Module / Unit	R22 Syllabus	Revised Syllabus (R25)	Changes	% Revised
Module 1 – Unit 1	Sustainable development, natural resources (forest, water, energy, mineral, land), ecology, ecosystems, population ecology	Similar topics; added biotic interactions, global energy scenario	Minor enhancements	15%
Module 1 – Unit 2	Biodiversity, hotspots, indices, threats, conservation, traditional knowledge	Similar topics; removed biodiversity indices, added protected areas	Moderate reorganization	20%
Module 1 – Practices	Waste-to-wealth, biogas, compost, solar models, plantation, disposal, herbarium, etc.	Same practices retained + new field-based activities (e.g. pollution studies, bird watching)	Field project-based activities significantly expanded	40%
Module 2 – Unit 1	Waste management (various types), water treatment	Retained topics + added pollution monitoring devices and strategies in industries	Expanded scope	25%
Module 2 – Unit 2	Health & hygiene, toxicity studies (heavy metals, asbestos, tobacco), bioremediation	Same core content	Slight refinement	10%
Module 2 – Unit 3	Not present	New Unit on advanced pollution control techniques (catalytic converters, biomanipulation)	Completely new unit	100%
Module 2 – Practices	Water/wastewater analysis, ethanol from waste, campus plastic survey, STP visits	All retained + agricultural runoff, biodiversity survey, comparison studies	Moderate - extension	30%

Approximately 34.5% of the Environmental Studies syllabus was revised in the transition from R22 to R25.

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