

## Koneru Lakshmaiah Education Foundation

(Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

Accredited by NAAC as 'A++' Grade University ♦ Approved by AICTE ♦ ISO 9001-2015 Certified

Campus: Green Fields, Vaddeswaram - 522 502, Guntur District, Andhra Pradesh, INDIA.

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### XXXV Academic Council – Annexure 2.10

23-03-2022

### DEPARTMENT OF CHEMISTRY MINUTES OF 5<sup>th</sup> BOARD OF STUDIES MEETING

The department of chemistry conducted 5<sup>th</sup> BOS meeting on 23-03-2022 in virtual mode (WebEx Link:

<https://kluniversity.webex.com/kluniversity/e.php?MTID=m31c3d997eb5e8ebb395a04defbbf8057>) from 10:00 AM to 1:00 PM.

#### The following members were present:

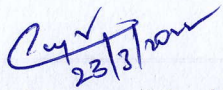
1. Dr J V Shanmukha Kumar, Professor, HOD- Chairperson
2. Dr K R S Prasad, Professor, Internal Member
3. Dr K Ravindranath, Professor, Internal Member
4. Dr M Sujatha, Associate Professor, Internal Member
5. Dr T Bhaskara Rao, Assistant Professor, Internal Member
6. Dr Pradeep Kumar Brahman, Assistant Professor, Internal Member
7. Dr A Venkateswara Rao, Assistant Professor, Internal Member
8. Dr K Deepti, Assistant Professor, Internal Member
9. Dr Monima Sarma, Assistant Professor, Internal Member
10. Dr G Sunita Sundari, HOD- Physics, Special Invitee
11. Dr B V Appa Rao, Professor & HOD- Mathematics, Special Invitee
12. Dr C Suresh Reddy, Professor- S V University, External Member
13. Dr D Ramachandran, Professor- Acharya Nagarjuna University, External Member
14. Dr V Sri Ram, Head- Analytical division, Blue Fish Pharma, Bangalore, Special Invitee
15. Dr S Ramakrishna, Sr. Scientific Manager, Daicel Chiral Technologies India Private Limited, Hyderabad, Special Invitee
16. Dr J Subba Rao, Sr Group leader, Hetero Research Foundation, Hyderabad, Special Invitee.

#### Members Absent:

1. Dr V R Raghuveer, Professor & Dean Academics, KLEF, Special Invitee.

Dr. J. V. Shanmukha Kumar, the Chairman of the Board of Studies (BOS), initiated the meeting by extending a warm welcome to the external members and introduced them to the internal and co-opted members. He expressed his gratitude to them for agreeing to join the Board of Studies.

After due deliberations, the following resolutions have been adopted.

  
Dr. J.V. Shanmukha Kumar  
Head of the Department  
Department of Chemistry  
Koneru Lakshmaiah Education Foundation  
(Deemed to be University)  
Green Fields, Vaddeswaram-522 302,  
Guntur Dist., A.P., India.

## AGENDA and RESOLUTIONS

### AGENDA ITEM 1:

<b>Discussing Vision and Mission of the department</b>	<b>Recommended for approval in academic council</b>
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Prof. J. V. Shanmukha Kumar, HoD, presented the Vision and Mission statements to the DAC members. Followed by the presentation, brief discussion was made on the statements.

#### **Vision of the Chemistry Department**

To impart quality higher education in all branches of Chemistry along with excellence in research to provide manpower to multi sectoral Industries, Research Institutions and Academia.

#### **Mission of the Chemistry Department**

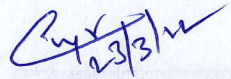
- (i) Propagation of higher education in Chemistry and provide wider job opportunities.
- (ii) Prepare competitive and professional postgraduates and researchers, having sound knowledge of basics and applied chemistry for the betterment of society.
- (iii) Strengthen Industry – Academia relationship to catalyze innovation and growth in technology.

### AGENDA ITEM 2:

<b>Merging of Design Thinking and Innovation (DTI)-1 &amp; 2 courses as Design Thinking and Innovation as a single course in Y22 M. Sc Chemistry Curriculum</b>	<b>Recommended for approval in academic council.</b>
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**Recommendation:** Based on the feedback given by Dr. K. Deepti, Asst. Prof, Dept. of Chemistry, KLEF it is recommended to merge DTI-1 and DTI- 2 courses as a single course in Y22 M. Sc curriculum.

**Resolution:** It is resolved and recommended for approval in academic council that both earlier scheduled DTI-1 and DTI-2 are merged as a single course as DTI (with course details as 21UC1203, 0-0-4-0; Cr: 2). The merged course is implemented for the students in university level to conduct Hybrid mode (offline/online) classes with initiation from Y21 batch admitted students itself. The same is permitted by the external, internal, and other stakeholders of BOS for its inclusion as a single merged course that adds students to think innovatively and enhance employability and entrepreneur skills. The proposed syllabus for the course is shown in Annexure – I.

  
**Jr. J.V. Shanmukha Kumari**  
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### AGENDA ITEM-3

To review and finalize the new courses for M. Sc Chemistry 2022 admitted batch.

Recommended for approval in academic council.

**Recommendation:** Based on the stakeholder feedback (Dr. T. Bhaskara Rao, Asst. prof. Chemistry Dept., KLEF), it is recommended to introduce communication and logical skills as a new course in Y22 M. Sc curriculum.

**Resolution:** It is resolved and recommended for approval in academic council, to implement the English course i.e., 22CY5318-**Communication and Logical Skills** in MSc Chemistry program for the students admitted in the AY 2022-23. The motivation and implementation of this course is it will enhance and improve the soft and communication skills of students. The proposed syllabus for the course is shown in **Annexure -III**

### AGENDA ITEM-4

To review and finalize the modified course structure M. Sc Chemistry 2022 admitted batch.

Recommended for approval in academic council.

**Recommendation:** Based on the stakeholder feedback (Dr. V. Sri Ram, Blue Fish Pharmaceuticals and Dr. C. Suresh Reddy, Prof., S V University), it is recommended to revise the syllabus of organic chemistry-II, organic synthesis- I and medicinal chemistry courses as per the industrial requirement in Y22 M. Sc curriculum.

**Resolution:** It is resolved and recommended for approval in academic council, to implement the revised syllabus for the following courses i.e., 22CY5203-**Organic Chemistry-II**, 22CY5310-**Organic Synthesis-I**, 22CY5407-**Organic Synthesis-II**, 22CY5318-**Medicinal Chemistry** in MSc Chemistry program for the students admitted in the AY 2022-23. The motivation and implementation of this revision of course is it will enhance and improve the employability skills of students. The proposed syllabus for the course is shown in **Annexure -II**

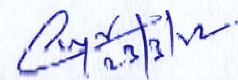
### AGENDA ITEM-5

To review and finalize the DAC minutes.

Recommended for approval in academic council.

**Recommendation:** To approve the DAC minutes.

**Resolution:** It was resolved that the reviewed DAC minutes are approved in BOS and recommended to present in academic council for approval.

  
**Dr. J.V. Shanmukha Kuma:**  
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#### AGENDA ITEM-6

<b>Improving Industry Collaboration to improve placement opportunities for the students.</b>	<b>Recommended for approval in academic council</b>
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**Recommendation:** Based on the stakeholder feedback (Dr. B Pradeep Kumar, Assoc. Prof., KLEF,), it is recommended to improve Industry Collaboration to improve placement opportunities for the students.

**Resolution:** It is resolved and recommended for approval in academic council to:

- (i) Arrange corporate guest lectures by industry experts.
- (ii) Arrange industry visits & Research Institutions at least once in a semester.
- (iii) Skill assessment tests can be conducted by industry experts.
- (iv) Connect with the alumni who are in the industry and ask them to arrange on-campus placements.

#### AGENDA ITEM – 7

<b>Proposed to include Minor degree certificate courses offered by M. Sc Chemistry to the other departments for the A.Y. 2022-23 admitted batch students.</b>	<b>Recommended for approval in academic council</b>
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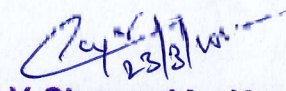
**Recommendation:** Based on the stakeholder feedback (Dr. K R S Prasad, Prof., KLEF and Dr A Venkateswara Rao, Asst. Prof., KLEF), it is recommended to offer minor degree certificate courses to other departments from the A.Y. 2023-2024.

**Resolution:** It is resolved and recommended for approval in academic council to offer Minor degree certificate courses to other department students with 20 credits in a discipline other than his/her major discipline. The proposed syllabus for the course is shown in **Annexure – IV**.

#### AGENDA ITEM – 8

<b>Proposed to include value-added, skill development, employability, entrepreneurship, and work-in lieu courses for the AY 2022-23.</b>	<b>Recommended for approval in academic council</b>
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**Resolution:** It is resolved and recommended to academic council to enhance employability of the students, value-added, skill development, employability, entrepreneurship, and work-in lieu courses are already included in the existing curriculum. The proposed syllabus for the course is shown in **Annexure – V**.

  
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
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620 Dr. J. V. Shanmukha Dr. D. Ramachandran Dr. Pradeep Kumar Dr. Sriram Valavala c.suresh reddy

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5<sup>TH</sup> BOS MEETING  
23-03-2022, 2.30 PM  
DEPARTMENT OF CHEMISTRY  
KLEF  
VADESWARAM, GUNTUR

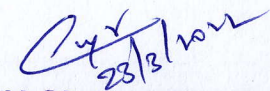
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 3179 Dr. A. Venkatesw	 c.suresh reddy	 K R S Prasad	 620 Dr. J. V. Shanmukha
 Dr. D. Ramachandran	 5745 Dr. Monima Sar	 S.S.R. Krishna_Ravind	 jammula subbarao
 2818 Dr. T. Bhaskara R	 Dr. Pradeep Kumar	 Dr. Sriram Valavala	 2364 Dr. M. Sujatha

*Cy V*  
28/3/2022


**Dr. J.V. Shanmukha Kumar**  
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SI.NO	SALUTATION	FULL NAME	DESIGNATION	POSITION	Signature
1	Dr.	V. R. Raghuvier	Dean Academics	Patron	
2	Dr.	J. V. Shanmukha Kumar	HOD	BOS-Chair	<i>J.V. Shanmukha Kumar</i> 23/3/2022
3	Dr.	K. R.S. Prasad	Professor	Secretary	<i>K.R.S. Prasad</i>
4	Dr.	C. Suresh Reddy	Professor, SVU	External	<i>C. Suresh Reddy</i> 23/6/2022
5	Dr.	D. Ramachandran	Professor, ANU	External	<i>D. Ramachandran</i>
6	Dr.	K. Ravindhranath	Professor	Internal	<i>K. Ravindhranath</i>
7	Dr.	A. Vani	Professor	Internal	<i>A. Vani</i>
8	Dr.	M. Sujatha	Assoc. Professor	Internal	<i>M. Sujatha</i>
9	Dr.	T. Bhaskara Rao	Asst. Professor	Internal	<i>T. Bhaskara Rao</i>
10	Dr.	A. Venkateswara Rao	Asst. Professor	Internal	<i>A. Venkateswara Rao</i>
11	Dr.	Pradeep Kumar Brahman	Asst. Professor	Internal	<i>Pradeep Kumar Brahman</i>
12	Dr.	K. Deepti	Asst. Professor	Internal	<i>K. Deepti</i>
13	Dr.	Monima Sarma	Asst. Professor	Internal	<i>Monima Sarma</i>
14	Dr.	B. V. Appa Rao	HOD-Maths	Spl. Invitee	<i>B. V. Appa Rao</i>
15	Dr.	G. Sunitha Sundari	HOD-Physics	Spl. Invitee	<i>G. Sunitha Sundari</i>
16	Dr.	V. Sriram	Head, Analytical Division, Bluefish Pharmaceuticals India Pvt Ltd, Bangalore	Spl. Invitee	<i>V. Sriram</i>
17	Dr.	S. Sri Rama Krishna	Sr. Scientific Manager DAICEL CHIRAL TECHNOLOGIES INDIA PRIVATE LIMITED Hyderabad,	Spl. Invitee	<i>S. Sri Rama Krishna</i>
18	Dr.	J. Subba Rao	Sr. Group leader in Hetero Research and Foundation, Balanagar, Hyd.	Spl. Invitee	<i>J. Subba Rao</i>

  
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### M. Sc Chemistry-Program Structure (A.Y.2022-24)

S.No	Course Code	Course Name	Category	L	T	P	S	Cr
1	22CY5101	Theoretical Chemistry-I	Prof. Core	4	0	0	0	4
2	22CY5102	Inorganic Chemistry- I	Prof. Core	4	0	6	0	7
3	22CY5103	Organic Chemistry-I	Prof. Core	4	0	6	0	7
4	22CY5104	Physical Chemistry-I	Prof. Core	4	0	6	0	7
5	22CY5201	Theoretical Chemistry-II	Prof. Core	4	0	0	0	4
6	22CY5202	Inorganic Chemistry- II	Prof. Core	4	0	6	0	7
7	22CY5203	Organic Chemistry-II	Prof. Core	4	0	6	0	7
8	22CY5204	Physical Chemistry-II	Prof. Core	4	0	6	0	7
9	22CY5301	Instrumental Methods of Analysis-I	Prof. Core	4	0	6	0	7
10	22CY5302	Quality Control and Classical Methods of Analysis	Prof. Core	4	0	0	0	4
11	22CY5303	Applied Chemical Analysis	Prof. Core	4	0	6	0	7
12	22CY5310	Organic Synthesis-I	Prof. Core	4	0	6	0	7
13	22CY5311	Natural Products and Bio-molecules	Prof. Core	4	0	6	0	7
14	22CY5312	Organic Spectroscopy	Prof. Core	4	0	0	0	4
15	22CY5401	Instrumental Methods of Analysis-II	Prof. Core	4	0	6	0	7
16	22CY5402	Advance Applied Chemical Analysis	Prof. Core	4	0	6	0	7
17	22CY5403	Dissertation with Research Publication	Skill Development	0	0	12	0	6
18	22CY5407	Organic Synthesis-II	Prof. Core	4	0	6	0	7
19	22CY5408	Advance Heterocyclic chemistry	Prof. Core	4	0	6	0	7
20	22CY5409	Dissertation with Research Publication	Skill Development	0	0	12	0	6
21	22CY5304	Separation Techniques	Prof. Electives	3	0	0	0	3
22	22CY5305	Applications of Chemical Spectroscopy	Prof. Electives	3	0	0	0	3
23	22CY5306	Bio analytical Chemistry	Prof. Electives	3	0	0	0	3
24	22CY5307	Environmental Chemistry	Prof. Electives	3	0	0	0	3
25	22CY5308	Surface Analytical Techniques	Prof. Electives	3	0	0	0	3
26	22CY5309	Analysis of Food and Drugs	Prof. Electives	3	0	0	0	3
27	22CY5313	Photo Chemistry and Pericyclic reactions	Prof. Electives	3	0	0	0	3
28	22CY5314	Organometallic Chemistry	Prof. Electives	3	0	0	0	3
29	22CY5315	Bio Organic Chemistry	Prof. Electives	3	0	0	0	3
30	22CY5316	Green & Sustainable Chemistry	Prof. Electives	3	0	0	0	3
31	22CY5317	Supra molecular Chemistry	Prof. Electives	3	0	0	0	3
32	22CY5318	Medicinal chemistry	Prof. Electives	3	0	0	0	3
33	22CY5404	Chromatographic Techniques & Method Validation	Prof. Electives	3	0	0	0	3
34	22CY5405	Classical Methods of Analysis	Prof. Electives	3	0	0	0	3
35	22CY5406	Chemo Sensors and body fluid analysis	Prof. Electives	3	0	0	0	3
36	22CY5410	Drug Design & Development	Prof. Electives	3	0	0	0	3
37	22CY5411	Chemistry of Drugs and Pharmaceuticals	Prof. Electives	3	0	0	0	3

  
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38	22CY5412	Nano Chemistry	Prof. Electives	3	0	0	0	3
39	21UC1203	Design Thinking and Innovation	HSS	1	0	0	4	2
40	22UC2106	Communication and Logical Skills	HSS	0	0	0	2	2

### Annexure-I

**Annexure I: To include and merge Design Thinking and Innovation (DTI) - 1 and 2 courses as a single course Design Thinking and Innovation (DTI) implemented from Y21 batch onwards.**

It is resolved and recommended to academic council in the BOS meeting that both earlier scheduled DTI-1 and DTI-2 are merged as a single course as DTI (with course details as 21UC1203, 0-0-4-0; Cr: 2). The same implemented for the students at the university level to conduct Hybrid mode (offline/online) classes with initiation from Y21 batch students. The same is permitted by the external, internal, and other stakeholders of BOS for its inclusion as a single merged course that add students to think innovatively and enhance the employability and entrepreneur skills.

Course code : 21UC1203

L-T-P-S : 0-0-4-0

Pre-requisite : NIL

Credits : 2

### Syllabus

Design thinking an overview, Design Thinking for Contextualized Problem-Solving: Problem Selection/Definition Need for Cultural Relevance (Time, Space, and Environment).

Empathy: definition, Empathic research: framing interview questions, focus groups, procedure to conduct skilled interviews, Insights from Empathetic research, Define: Developing user personas, nuggets from insights, laying customer journey maps, POV statements and POV questions to define user needs. Ideate: Techniques to generate, shortlist and evaluate Ideas: Rapid Estimation form and Solution concept form.

Prototyping and Testing: Products vs. Services, Rough Prototypes, Testing Techniques, User Experience High-Fidelity Prototypes

Entrepreneurial Innovation: Innovation Management, Business Model Basics, Financial Estimation, Pitch Decks, IPR Considerations.

### Reference books

1. Michael Lewrick, Patrick Link & Larry Leifer: The Design Thinking *Play Book*. Wiley Press: 2018

**Annexure II: To review and finalize the modified course structure M. Sc Chemistry for the AY 2022-23 batch to enhance the students' employability skills.**

It is resolved and recommended to academic council in the BOS meeting conducted on 23/03/2022 to implement the revised syllabus for the mentioned courses in MSc Chemistry program for the students admitted for from A.Y. 2022-23. The motivation and implementation of this syllabus revision is it will enhance and improve the employability skills of students.

Course Title : Organic Chemistry-II

L T P S Structure : 4-0-6-0

Course Code : 22CY5203

Credits : 7

**Syllabus: Reaction mechanism:** Electrophilic addition to carbon-carbon double bond: Stereoselective addition to carbon-carbon double bond; anti addition-Bromination and epoxidation followed by ring opening-Syn addition of OsO<sub>4</sub> and KMnO<sub>4</sub>. Aliphatic Electrophilic Substitution: Bimolecular mechanism-SE<sub>2</sub> and SE<sub>1</sub>. SE<sub>1</sub> mechanism, electrophilic substitution accompanied by double bond shifts. Effects of substrate, leaving group and the solvent polarity on the reactivity. Aromatic Electrophilic Substitution: The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, hipso-attack, orientation in other ring systems. Quantitative

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treatment of reactivity in substrates and electrophiles. Diazonium coupling-Vilsmeier reaction, Gattermann-Koch reaction. **Elimination reactions:** Types of Elimination reactions-E<sub>2</sub>, E<sub>1</sub>, E<sub>1cB</sub>-mechanisms. Orientation and stereoselectivity in E<sub>2</sub> eliminations-Bredt's rule, Saytzeff's rule and Hofmann's rule. Pyrolytic syn eliminations-Pericyclic reactions, Factors influencing the elimination reactions-Elimination Vs substitution. Additions involving electrophiles, nucleophiles, and free radicals-Markovnikov's rule, Kharasch or peroxide effect (anti-Markovnikov's rule). Addition to Carbon-Hetero Multiple Bonds: Grignard reagents, organo-zinc and organo-lithium reagents to carbonyl and unsaturated carbonyl compounds. Mechanisms-metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters, and nitriles. Carbon-Carbon bond forming reactions (condensation) involving enolates. Named reactions-Aldol, Diels-Alder reaction, Knoevenagel, Mannich, Benzoin, Perkin, Oppenauer oxidation, Clemmensen reduction, Birch reduction, Michael addition, and Stobbe reactions. Hoffmann, Claisen and Favorsky rearrangements, Hydroboration. Introduction to Pericyclic reactions: Role of FMO's, classification of pericyclic reactions. **Green Chemistry:** Introduction-Basic principles of Green Chemistry, Green catalysis, Bio catalysis, Examples of Green Reactions-Synthesis of ibuprofen, clean Fischer-Indole synthesis comparison with conventional method. **Natural Products:** Alkaloids-General methods of extraction and isolation of natural products, classification based on nitrogen heterocyclic ring, structure elucidation and synthesis: Atropine, Papaverine and Quinine. Terpenoids-Classification of terpenoids, isolation of lower terpenoids, Isoprene, special isoprene rule and Biogenetic Isoprene rule. Structure determination and synthesis: Terpeneol, Farnesol, Camphor and Abietic acid. **NanoChemistry**-Introduction-Carbon Nano tubes: Structure of single and multiwalled carbon nano tubes, synthesis-solid and gaseous carbon-based production technique, synthesis with Controlled orientation, Growth mechanism (catalyst free growth & catalyst activated growth) of carbon nano tubes-applications.

Course Title	: Organic Synthesis-I	L T P S Structure	: 4-0-6-0
Course Code	: 22CY5310	Credits	: 7

**Syllabus:** Formation of Carbon-Carbon single bonds: alkylation via enolate the enamine and related reactions, umplong (dipole inversion) reactions – the aldol reaction – applications of organo palladium, organo nickel and organo copper reagents, applications of  $\alpha$ -thio carbanions, seleno carbonions and sulphur ylides, synthetic applications of carbenes and carbenoids. Formation of carbon-carbon double bonds: Elimination reactions Pyrolytic, syneliminations, sulphoxide-sulphonate rearrangement the witting reaction-alkenes from aryl sulphonyl hydrazones, claisen rearrangement of allyl vinyl ethers. Organoboranes: Preparation of Organo boranes viz hydroboration with BH<sub>3</sub>-THF, di cyclohexyl borane, disiamyl borane, thexyl borane, 9-BBN and di isopino camphenyl borane, functional group transformations of Organo Boranes-Oxidation, protonolysis and rearrangements. Formation of carbon – carbon bonds viz organo boranes carbonylation, the cyanoborate process and reaction of alkenyl boranes and tri alkenyl borates. Methods of polymerization (a) addition polymerization (b) Condensation polymerization (c) Radical polymerizations (two examples of each method) Reactions of un activated carbon-hydrogen bonds: The Hoffmann Lieffier- Freytag reaction-the Barton Reaction-Photolysis of organic hypohalites. Mukaiyama esterification, Mitsunobu reaction, Baylis Hillman reaction, Suzuki coupling, Wacker process, Heck reaction, Sonogashira reaction, McMurry coupling. Multicomponent reactions: Domino/cascade reactions, Strecker synthesis, Biginelli synthesis, Multicomponent reactions using alkyl isocyanides: Passerini and Ugi-4-component synthesis.

Course Title	: Organic Synthesis-II	L T P S Structure	: 4-0-6-0
Course Code	: 22CY5407	Credits	: 7

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**Syllabus:** Organo silanes, Synthetic applications of trimethylsilyl chloride dimethyl-t-butyl silyl chloride, trimethyl silyl cyanide, trimethylsilyl iodide and trimethylsilyl triflate, synthetic applications of silyl carbanion and B-silyl carbonium ions. Oxidations of hydrocarbons, alkenes, alcohols, aldehydes, and ketones. Oxidative coupling reactions using Pb (OAc)<sub>4</sub>, NBS, CrO<sub>3</sub>, SeO<sub>2</sub>, NiO<sub>2</sub> Dc- alkoxyl uphonium yields, KMnO<sub>4</sub>, OsO<sub>4</sub>, peracids and Ti (III) nitrate. Catalytic hydrogenation (homogeneous and heterogeneous), reduction by dissolving metals. Reduction by hydride transfer -reagents, reduction with hydrazine and diamide, selectivity in reduction of nitroso and nitro compounds, reductive cleavage. Design of Organic Synthesis: Rearrangement involving migration to electron-deficient carbon: Wagner-Meerwein, Pinacol-Pinacolone, Benzil-Benzilic acid, Wolff, Arndt-Eistert synthesis, Rearrangement involving migration to electron-deficient nitrogen: Hofmann, Curtius, Lossen, Schmidt, Beckmann. Retrosynthesis the disconnection approach-basic principles convergent and linear synthesis. Phase transfer catalysis-Principle and applications.

Course Title	: Medicinal Chemistry	L T P S Structure	: 3-0-0-0
Course Code	: 22CY5318	Credits	: 3

**Syllabus:** Classification and Nomenclature of Drugs. Medicinal chemistry: Important terminology in medicinal chemistry. Classification and Nomenclature of Drugs. Concept of prodrugs and soft drugs. a) Prodrugs: i) Prodrugs designing, types of prodrugs. Prodrug formation of compounds containing various chemical groups, Prodrugs, and drug delivery system b) Soft drugs: i) Soft drug concept ii) Properties of soft drug. Theories of drug activity: i) Occupancy theory, ii) Rate theory, iii) Induced theory. QSAR method: Introduction, Methods used in QSAR studies, Hansch method, Free-Wilson method, Advantages and disadvantages of free approach, Computer based methods of QSAR related to receptor binding, Physico-Chemical properties, Lipophilicity, Electronic parameters, Steric substituent constants, Experimental determination of partition coefficients. Structure based drug design: i) Process of structure-based drug design, ii) Deactivation of certain drug, iii) Determination of the structure of the protein, iv) Design of inhibitors. Molecular modelling using computers. i) Introduction ii) Uses of molecular modeling: a) Manual use, b) Further-computer programming, c) X-ray crystallography. Pharmacokinetics and Pharmacodynamics. A] Pharmacokinetics: a) Drug absorption, b) Distribution, c) Elimination, d) Disposition. B] Pharmacodynamics. a) Introduction, Elementary treatment of enzyme inhibition, b) Membrane active drug, c) Sulphonamides Mechanism of action of following drugs: Action of CNS disorder, inflammation, cardiac dysfunction. MC-4: Drug metabolism. Nucleic acids: Structure and function of physiologically important nucleotides (c-AMP, ADP, ATP) and nucleic acids (DNA and RNA), replication, genetic code, protein biosynthesis, mutation. Chemical synthesis of oligonucleotides: Phosphodiester, Phosphotriester, Phosphoramidite and H-phosphonate methods including solid phase approach.

**Annexure III: To include English course in MSc Chemistry program for the AY 2022-23 students to enhance the students' soft skills.**

It is resolved and recommended to academic council in the BOS meeting conducted on 23/03/2022 to implement the English course in MSc Chemistry program for the students admitted for AY 2022-23. The motivation and implementation of this value-added course is it will enhance and improve the soft and communication skills of students.

**Course Code:** 22UC2106

**Course Name:** Communication and Logical Skills

**L-T-P-S:** 0-0-4-0

**Credits:** 2

**Prerequisite:** NIL

*[Signature]*  
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CO#	Course Outcome (CO)	PO	PSO	BTL
CO1	Relating grammar concepts and receptive skills for documenting and editing.	6	2	2
CO2	Able to set goals through SWOT and present themselves effectively during the Interview.	6	2	2
CO3	Apply and formulate the concepts of mathematical principles besides logic and basic mathematical formulae to solve word-based situational problems.	6	2	2
CO4	Estimate inductive reasoning, to categorize the rules set from a given list of observations and relate them to predict the conclusions according to the given conditions.	6	2	2

**Syllabus:** Critical reading, Tenses, Spotting errors, Sentence completion, Sentence rearrangement, and Paragraph writing. SWOT, Goal Setting, Listening skills, Leadership, Presentation Skills, Public speaking, Jam, Time Management, Email Etiquette. Numbers- Divisibility Rules, Units Digit, Remainders, LCM & HCF, Simplification, Problems on Ages, Ratio & Proportion, Partnership, Averages & Allegations, Percentages, Profit & Loss, Simple & Compound Interest, Data Interpretation. Number & Letter Series and Analogy, Coding-Decoding, Odd Man Out, Blood Relations, Direction Sense, Syllogisms, Clocks, Calendars, Logical Venn Diagrams, Data Sufficiency.

**Textbooks:**

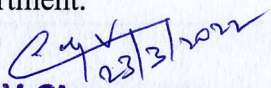
1. Objective English for Competitive Examination by Hari Mohan Prasad and Uma Sinha. Mc Graw Hill Education, 2017.
2. English Language Communication Skills, Cengage, 2014.
3. Quantitative Aptitude for CAT by Arun Sharma, McGraw Hill Education
4. Analytical & Logical Reasoning, Peeyush Bhardwaj, Arihant Publications.

**Reference Books:**

1. Quantitative Aptitude by R.S. Agarwal, SCHAND Publications.
2. A Modern Approach to Verbal Reasoning by R.S. Agarwal, SCHAND Publications.
3. Developing Soft Skills by Robert M. Sherfield, Rhonda J., Patricia J. Moodi; Cornerstone Publications.

**Annexure IV: To propose to include Minor degree programs offered by MSc Chemistry in Instrumental Methods for the A.Y. 2022-23 batch.**

A minor degree is an additional credential a student may earn for 20 credits in a discipline other than his/her major discipline. These additional credits shall be acquired through the list of courses for a Minor Degree prescribed by the respective departments. Students, who are desirous of pursuing their special interest areas other than the chosen discipline of Engineering / Technology / Management / Basic Sciences, may opt for additional courses in minor specialization groups offered by a department other than their parent department.

  
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S.No	Name of the Minor Degree	Course Code	Course Title	L	T	P	S	Cr
1	Instrumental Methods	22CY5301	Instrumental Methods of Analysis-I	4	0	6	0	7
		22CY5401	Instrumental Methods of Analysis-I	4	0	6	0	7
		22CY5306	Bio analytical Chemistry	3	0	0	0	3
		22CY5307	Environmental Chemistry	3	0	0	0	3
		22CY5308	Surface Analytical Techniques	3	0	0	0	3
		22CY5309	Analysis of Food and Drugs	3	0	0	0	3
		22CY5405	Classical Methods of Analysis	3	0	0	0	3
		22CY5410	Drug Design & Development	3	0	0	0	3
		22CY5411	Chemistry of Drugs and Pharmaceuticals	3	0	0	0	3
	* 22CY5301 & 22CY5401 are Mandatory		14 Credits					
	** Any two electives can be done		06 credits					
	<b>Total</b>		20 Credits					

#### Annexure V:

**(i) To propose and include value-added courses for upcoming AY 2022-23 batch.**

Value added courses are the types of courses which help a particular individual to develop their own skills in their chosen field of study. These courses are designed to enhance the standard of the students beyond those levels specified in academic curriculum. To enhance the employability of the students, value-added courses are included in the curriculum. Hence, it is proposed for the approval of English course as value-added course in BOS meeting jointly proposed and conducted by inter-departments (Physics, Mathematics and English). In this regard, the department has received feedback from different stakeholders of our curriculum and recommended the same for its inclusion.

**(ii) To propose and include the courses focusing on skill development for AY 2022-23.**

Most of the courses come under practical session in MSc Chemistry program are all focused and motivated the students to develop their skills in all aspect of teaching and research. For eg., the courses such as 22CY5301-IMA-I, 22CY5401-IMA-II, 22CY5302-Applied Chemical Analysis, 22CY5402-Advanced Applied Chemical Analysis, 22CY5310-Organic Synthesis-I, 22CY5407-Organic Synthesis-II, 22CY5311-Natural Products and Bio-molecules are meant to develop and enhance the student's skill where the students have hands-on sessions regularly which makes the student specialized in handling the lab equipment's & instruments widely used in Pharmaceutical industries.

**(iii) To propose and include the courses focusing on employability for AY 2022-23.**

The courses related with practical and theoretical knowledge concerned to Organic and Analytical chemistry are designed in such a way they are highly benefitted providing a lot of opportunities and employability for the students in both government and private sectors.

**(iv) To propose and include the courses focusing on entrepreneurship for AY 2022-23.**

It is hereby proposed to include the Design Thinking and Innovation (DTI) course with course code: 21UC1203 (0-0-4-0; Cr: 2) as the course is purely related to and focused on the Entrepreneurship. However, the course is not offered in the department level, and it is floated in

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the University level at any stage/semester during the student program period. From this course, the student will learn the abilities of designing and identifying a problem, creating, and thinking innovatively to solve the societal problems, and helps the student to grow individual where they can enhance the skill of self-understanding, creative thinking, and decision-making policies.

**(v) To propose and include courses in Student Activity Centre (SAC) for AY 2022-23.**

It is proposed and resolved for approval to include courses offered in Student Activity Centre (SAC) for AY 2022-23 related to the issues on societal, environmental, and public health. However, it is purely in the interest of students in choosing the courses whenever the university offers at the central level to take up courses under SAC.

**(vi) To propose and include Work-in lieu course for AY 2022-23.**

The elite students who are on internships selected in reputed national institutes/universities, research organizations and industries are encouraged to opt for the work-in lieu courses (purely in online mode) and provide feasibility to the students. Hence, it is proposed and resolved for approval the same in BOS meeting to provide opportunity and get benefitted with Work-in Lieu courses offered to the highly bright/elite students (CGPA >9.0).

  
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1. Program structure (with all Courses) containing following categorization.

Course Code	Course Name	Course Category	L	T	P	S	CR	Pre - Requisite	New Course/Revised Course/Retained Course	Stakeholder Category	Justification for considering the feedback
22CY5101	Theoretical Chemistry-I	Prof. Core	4	0	0	0	4	-	Retained	-	Employability
22CY5102	Inorganic Chemistry- I	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5103	Organic Chemistry-I	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5104	Physical Chemistry-I	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5201	Theoretical Chemistry-II	Prof. Core	4	0	0	0	4	-	Retained	-	Employability
22CY5202	Inorganic Chemistry- II	Prof. Core	4	0	6	0	7	-	Retained	--	Employability
22CY5203	Organic Chemistry-II	Prof. Core	4	0	6	0	7	-	Revised	Faculty, academic peers, industry person	Employability
22CY5204	Physical Chemistry-II	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5301	Instrumental Methods of Analysis-I	Prof. Core	4	0	6	0	7	-	Retained	-	Skill Development
22CY5302	Quality Control and Classical Methods of Analysis	Prof. Core	4	0	0	0	4	-	Retained	-	Skill Development
22CY5303	Applied Chemical Analysis	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5310	Organic Synthesis-I	Prof. Core	4	0	6	0	7	-	Revised	Faculty, academic peers, industry person	Employability
22CY5311	Natural Products and Bio-molecules	Prof. Core	4	0	6	0	7	-	Retained	-	Skill Development
22CY5312	Organic Spectroscopy	Prof. Core	4	0	0	0	4	-	Retained	-	Employability

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22CY5401	Instrumental Methods of Analysis-II	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5402	Advance Applied Chemical Analysis	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5403	Dissertation with Research Publication	Skill Development	0	0	1 2	0	6	-	Retained		Skill Development
22CY5407	Organic Synthesis-II	Prof. Core	4	0	6	0	7	-	Revised	Faculty, academic peers, industry person	Employability
22CY5408	Advance Heterocyclic chemistry	Prof. Core	4	0	6	0	7	-	Retained	-	Employability
22CY5409	Dissertation with Research Publication	Skill Development	0	0	1 2	0	6	-	Retained	-	Skill Development
22CY5304	Separation Techniques	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5305	Applications of Chemical Spectroscopy	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5306	Bio analytical Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5307	Environmental Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5308	Surface Analytical Techniques	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5309	Analysis of Food and Drugs	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5313	Photo Chemistry and Pericyclic reactions	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5314	Organometallic Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5315	Bio Organic Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development

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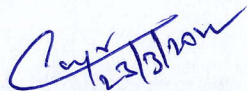
22CY5316	Green & Sustainable Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5317	Supra molecular Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5318	Medicinal chemistry	Prof. Elective	3	0	0	0	3	-	Revised	Faculty, academic peers	Skill Development
22CY5404	Chromatographic Techniques & Method Validation	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5405	Classical Methods of Analysis	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5406	Chemo Sensors and body fluid analysis	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5410	Drug Design & Development	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5411	Chemistry of Drugs and Pharmaceuticals	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
22CY5412	Nano Chemistry	Prof. Elective	3	0	0	0	3	-	Retained	-	Skill Development
21UC1203	Design Thinking and Innovation	HSS	1	0	0	4	2	-	Revised	Student, faculty	Skill Development
22UC2106	Communication and Logical Skills	HSS	1	0	4	0	2	-	NEW	Academic peers, faculty	Skill Development

Percentage of Syllabus Revision=  $6/40 = 15\%$

Percentage of Courses focusing on Employability=  $15/40=25\%$

Percentage of Courses focusing on Entrepreneurship= Nil

Percentage of Courses focusing on Skill Development =  $7/40=17.5\%$

  
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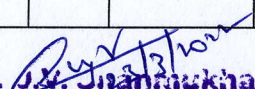
**AAA:**

Course wise Syllabus revision of approved structure as mentioned in point 1 (Program structure (with all Courses) containing following categorization).

S. No	Course Code	Course Title	Existing Syllabus	New Syllabus	Topics added/removed/replaced	Change in Outcome	Justification for the Modification	*Overall Revision Percentage
1	21UC 1203	Design Thinking and Innovation	<p>Overview of Design Thinking: Define Design Thinking, Differentiate Design Thinking from Design, Get an Overview of the Design Thinking Process, Empathize and Understand: Explain how empathy influences the outcomes of Design Thinking, List Different Empathy Research Techniques, Define the Guidelines for an Empathetic Research, Defining Needs: Explain how PoV can be used in defining the design problem, Use a structured approach to arrive at a PoV, Ideation for Solutions: List the best practices for conducting a successful ideating session, Describe the techniques for evaluating and prioritizing ideas, Prototyping: Define prototyping, Explain how prototyping aids in communicating ideas effectively, List various tools for prototyping Testing the Solution: Define the steps of a successful testing approach, Demonstrate the process of gathering and responding to user feedback. Design Thinking for Problem Solving Mindset : Understanding Problem Statements, Recapping Design Principles, Design Thinking Toolsets, Formulating approaches to Solutions, Applications of Design Thinking: Case Study Designing Services : Functional requirements, User requirements, Designing for sustainability and resilience, Case study Designing Thinking for Space and Environment : Functional requirements, user requirements, Implementing Design Thinking Framework, Case study Design Thinking and Innovation Management Culture : How design thinking leads to innovative thinking, Business model thinking, How design Thinking can lead to next generation customer experience, Metrics for successful implementation of Design Thinking Intellectual property and protection of ideas : Concepts of copyright, Intellectual Property, Trademark, Service mark Patent and typical business benefits, Applying for patent, Product license agreement, Open-source license, Need for protecting own R&amp;D innovations, Enhancing brand image with IP</p>	<p>Design thinking an overview, Design Thinking for Contextualized Problem-Solving: Problem Selection/Definition Need for Cultural Relevance (Time, Space, and Environment). Empathy: definition, Empathic research: framing interview questions, focus groups, procedure to conduct skilled interviews, Insights from Empathetic research, Define: Developing user personas, nuggets from insights, laying customer journey maps, POV statements and POV questions to define user needs. Ideate: Techniques to generate, shortlist and evaluate Ideas: Rapid Estimation form and Solution concept form. Prototyping and Testing: Products vs. Services, Rough Prototypes, Testing Techniques, User Experience High-Fidelity Prototypes Entrepreneurial Innovation: Innovation Management, Business Model Basics, Financial Estimation, Pitch Decks, IPR Considerations.</p>	Replaced	CO-1,2,3,4	<p>By the recommendations of Dean (Academics) and stakeholder feedback.</p> <p>adds students to think innovatively and enhance employability and entrepreneurial skills.</p>	100
2	22CY 5203	Organic Chemistry-II	<p>Reaction mechanism: Electrophilic addition to carbon-carbon double bond: Stereoselective addition to carbon-carbon double bond; anti addition-Bromination and epoxidation followed by ring opening-Syn addition of OsO<sub>4</sub> and KMnO<sub>4</sub>. Aliphatic Electrophilic Substitution: Bimolecular mechanism-SE<sub>2</sub> and SE<sub>1</sub>. SE<sub>1</sub> mechanism, electrophilic substitution accompanied</p>	<p>Reaction mechanism: Electrophilic addition to carbon-carbon double bond: Stereoselective addition to carbon-carbon double bond; anti addition-Bromination and epoxidation followed by ring opening-Syn addition of OsO<sub>4</sub> and KMnO<sub>4</sub>. Aliphatic Electrophilic Substitution: Bimolecular mechanism-SE<sub>2</sub> and SE<sub>1</sub>. SE<sub>1</sub> mechanism, electrophilic</p>	Revised	CO3	<p>By the recommendations of Dean (Academics), industry personal, alumni and Parents to meet the</p>	25%

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	<p>by double bond shifts. Effects of substrate, leaving group and the solvent polarity on the reactivity. Aromatic Electrophilic Substitution: The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, hipso-attack, orientation in other ring systems. Quantitative treatment of reactivity in substrates and electrophiles. Diazonium coupling-Vilsmeier reaction, Gattermann-Koch reaction. <b>Elimination reactions:</b> Types of Elimination reactions-E<sub>2</sub>, E<sub>1</sub>, E<sub>1cB</sub>-mechanisms. Orientation and stereoselectivity in E<sub>2</sub> eliminations-Bredt's rule, Saytzeff's rule and Hofmann's rule. Pyrolytic syn eliminations-Pericyclic reactions, Factors influencing the elimination reactions-Elimination Vs substitution. Additions involving electrophiles, nucleophiles, and free radicals-Markovnikov's rule, Kharash or peroxide effect (anti-Markovnikov's rule). Addition to Carbon-Hetero Multiple Bonds: Grignard reagents, organo-zinc and organo-lithium reagents to carbonyl and unsaturated carbonyl compounds. Mechanisms-metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters, and nitriles. Carbon-Carbon bond forming reactions (condensation) involving enolates. Named reactions-Aldol, Diels-Alder reaction, Knoevenagel, Mannich, Benzoin, Perkin, Oppenauer oxidation, Clemmensen reduction, Birch reduction, Michael addition, and Stobbe reactions. Hoffmann, Claisen and Favorsky rearrangements, Hydroboration. <b>Green Chemistry:</b> Introduction-Basic principles of Green Chemistry, Green catalysis, Bio catalysis, Examples of Green Reactions-Synthesis of ibuprofen, clean Fischer-Indole synthesis comparison with conventional method. <b>Natural Products:</b> Alkaloids-General methods of extraction and isolation of natural products, classification based on nitrogen heterocyclic ring, structure elucidation and synthesis: Atropine, Papaverine and Quinine. Terpenoids-Classification of terpenoids, isolation of lower terpenoids, Isoprene, special isoprene rule and Biogenetic Isoprene rule. Structure determination and synthesis: Terpeneol, Farnesol, Camphor and Abietic acid. <b>NanoChemistry-</b> Introduction-Carbon Nano tubes: Structure of single and multiwalled carbon nano tubes, synthesis-solid and gaseous carbon-based production technique, synthesis with Controlled orientation, Growth mechanism (catalyst free growth &amp; catalyst activated growth) of carbon nano tubes-applications.</p>	<p>substitution accompanied by double bond shifts. Effects of substrate, leaving group and the solvent polarity on the reactivity. Aromatic Electrophilic Substitution: The arenium ion mechanism, orientation and reactivity, energy profile diagrams. The ortho/para ratio, hipso-attack, orientation in other ring systems. Quantitative treatment of reactivity in substrates and electrophiles. Diazonium coupling-Vilsmeier reaction, Gattermann-Koch reaction. <b>Elimination reactions:</b> Types of Elimination reactions-E<sub>2</sub>, E<sub>1</sub>, E<sub>1cB</sub>-mechanisms. Orientation and stereoselectivity in E<sub>2</sub> eliminations-Bredt's rule, Saytzeff's rule and Hofmann's rule. Pyrolytic syn eliminations-Pericyclic reactions, Factors influencing the elimination reactions-Elimination Vs substitution. Additions involving electrophiles, nucleophiles, and free radicals-Markovnikov's rule, Kharash or peroxide effect (anti-Markovnikov's rule). Addition to Carbon-Hetero Multiple Bonds: Grignard reagents, organo-zinc and organo-lithium reagents to carbonyl and unsaturated carbonyl compounds. Mechanisms-metal hydride reduction of saturated and unsaturated carbonyl compounds, acids, esters, and nitriles. Carbon-Carbon bond forming reactions (condensation) involving enolates. Named reactions-Aldol, Diels-Alder reaction, Knoevenagel, Mannich, Benzoin, Perkin, Oppenauer oxidation, Clemmensen reduction, Birch reduction, Michael addition, and Stobbe reactions. Hoffmann, Claisen and Favorsky rearrangements, Hydroboration. Introduction to Pericyclic reactions: Role of FMO's, classification of pericyclic reactions. <b>Green Chemistry:</b> Introduction-Basic principles of Green Chemistry, Green catalysis, Bio catalysis, Examples of Green Reactions-Synthesis of ibuprofen, clean Fischer-Indole synthesis comparison with conventional method. <b>Natural Products:</b> Alkaloids-General methods of extraction and isolation of natural products, classification based on nitrogen heterocyclic ring, structure elucidation and synthesis: Atropine, Papaverine and Quinine. Terpenoids-Classification of terpenoids, isolation of lower terpenoids, Isoprene, special isoprene rule and Biogenetic Isoprene rule. Structure determination and synthesis: Terpeneol, Farnesol, Camphor and Abietic acid. <b>NanoChemistry-</b> Introduction-Carbon Nano tubes: Structure of single and multiwalled carbon nano tubes,</p>		<p>industrial requirement.</p>
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				synthesis-solid and gaseous carbon-based production technique, synthesis with Controlled orientation, Growth mechanism (catalyst free growth & catalyst activated growth) of carbon nano tubes-applications.				
3	22CY 5310	Organic Synthesis-I	<p>Formation of Carbon-Carbon single bounds: alkylation via enolate the enamine and related reactions, umplong (dipole inversion) reactions – the aldol reaction – applications of organo palladium, organo nickel and organo copper reagents, applications of <math>\alpha</math>-thio carbanions, selenocarbonions and sulphur ylides, synthetic applications of carbenes and carbenoids. Formation of carbon-carbon double bonds: Elimination reactions Pyrolytic, syneliminations, sulphoxide-sulphonate rearrangement the witting reaction-alkenes from aryl sulphonyl hydrazones, claisen rearrangement of allyl vinyl ethers. Organoboranes: Preparation of Organoboranes viz hydroboration with <math>BH_3</math>-THF, di cyclohexyl borane, disiamyl borane, thexyl borane, 9-BBN and diisopino camphenyl borane, functional group transformations of Organo Boranes-Oxidation, protonolysis and rearrangements. Formation of carbon – carbon bonds viz organo boranes carbonylation, the cyanoborate process and reaction of alkenyl boranes and trialkenyl borates. Methods of polymerization (a) addition polymerization (b) Condensation polymerization (c) Radical polymerizations (two examples of each method) Reactions of un activated carbon-hydrogen bonds: The Hoffmann Lieffier- Freytag reaction-the Barton Reaction-Photolysis of organic hypo thalites.</p>	<p>Formation of Carbon-Carbon single bounds: alkylation via enolate the enamine and related reactions, umplong (dipole inversion) reactions – the aldol reaction – applications of organo palladium, organo nickel and organo copper reagents, applications of <math>\alpha</math>-thio carbanions, selenocarbonions and sulphur ylides, synthetic applications of carbenes and carbenoids. Formation of carbon-carbon double bonds: Elimination reactions Pyrolytic, syneliminations, sulphoxide-sulphonate rearrangement the witting reaction-alkenes from aryl sulphonyl hydrazones, claisen rearrangement of allyl vinyl ethers. Organoboranes: Preparation of Organoboranes viz hydroboration with <math>BH_3</math>-THF, di cyclohexyl borane, disiamyl borane, thexyl borane, 9-BBN and diisopino camphenyl borane, functional group transformations of Organo Boranes-Oxidation, protonolysis and rearrangements. Formation of carbon – carbon bonds viz organo boranes carbonylation, the cyanoborate process and reaction of alkenyl boranes and trialkenyl borates. Methods of polymerization (a) addition polymerization (b) Condensation polymerization (c) Radical polymerizations (two examples of each method) Reactions of un activated carbon-hydrogen bonds: The Hoffmann Lieffier- Freytag reaction-the Barton Reaction-Photolysis of organic hypo thalites. Mukaiyama esterification, Mitsunobu reaction, Baylis Hillman reaction, Suzuki coupling, Wacker process, Heck reaction, Sonogashira reaction, McMurry coupling. Multicomponent reactions: Domino/cascade reactions, Strecker synthesis, Biginelli synthesis, Multicomponent reactions using alkyl isocyanides: Passerini and Ugi-4-component synthesis.</p>	Revised	CO4	By the recommendations of Dean (Academics), industry personal, alumni and Parents to meet the industrial needs.	30%
4	22CY 5540 7	Organic Synthesis-II	<p>Organo silanes, Synthetic applications of trimethylsilyl chloride dimethyl-t-butyl silyl chloride, trimethyl silyl cyanide, trimethylsilyl iodide and trimethylsilyl triflate, synthetic applications of silyl carbanion and B-silyl carbonium ions. Oxidations of hydrocarbons, alkenes, alcohols, aldehydes, and ketones. Oxidative coupling reactions using Pb (OAc)<sub>4</sub>, NBs, CRO<sub>3</sub>, SeO<sub>2</sub>, NinO<sub>2</sub> Dc-alkoxyl uphonium yields, KMnO<sub>4</sub>, OsO<sub>4</sub>, peracids and Ti (III) nitrate. Catalytic hydrogenation (homogeneous</p>	<p>Organo silanes, Synthetic applications of trimethylsilyl chloride dimethyl-t-butyl silyl chloride, trimethyl silyl cyanide, trimethylsilyl iodide and trimethylsilyl triflate, synthetic applications of silyl carbanion and B-silyl carbonium ions. Oxidations of hydrocarbons, alkenes, alcohols, aldehydes, and ketones. Oxidative coupling reactions using Pb (OAc)<sub>4</sub>, NBs, CRO<sub>3</sub>, SeO<sub>2</sub>, NinO<sub>2</sub> Dc-alkoxyl uphonium yields, KMnO<sub>4</sub>, OsO<sub>4</sub>, peracids and Ti (III) nitrate. Catalytic</p>	Revised	CO4	By the recommendations of Dean (Academics), industry personal, alumni and Parents to meet the industrial needs.	25%

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			and heterogeneous), reduction by dissolving metals. Reduction by hydride transfer -reagents, reduction with hydrazine and diamide, selectivity in reduction of nitroso and nitro compounds, reductive cleavage. Design of Organic Synthesis: Retrosynthesis the disconnection approach-basic principles convergent and linear synthesis. Phase transfer catalysis-Principle and applications.	hydrogenation (homogeneous and heterogeneous), reduction by dissolving metals. Reduction by hydride transfer -reagents, reduction with hydrazine and diamide, selectivity in reduction of nitroso and nitro compounds, reductive cleavage. Design of Organic Synthesis: Rearrangement involving migration to electron-deficient carbon: Wagner-Meerwein, Pinacol-Pinacolone, Benzil-Benzilic acid, Wolff, Arndt-Eistert synthesis, Rearrangement involving migration to electron-deficient nitrogen: Hofmann, Curtius, Lossen, Schmidt, Beckmann. Retrosynthesis the disconnection approach-basic principles convergent and linear synthesis. Phase transfer catalysis-Principle and applications.				
6	22CY 5318	Medicinal Chemistry	Classification and Nomenclature of Drugs. Medicinal chemistry: Important terminology in medicinal chemistry. Classification and Nomenclature of Drugs. Concept of prodrugs and soft drugs. a) Prodrugs: i) Prodrugs designing, types of prodrugs. Prodrug formation of compounds containing various chemical groups, Prodrugs, and drug delivery system b) Soft drugs: i) Soft drug concept ii) Properties of soft drug. Theories of drug activity: i) Occupancy theory, ii) Rate theory, iii) Induced theory. QSAR method: Introduction, Methods used in QSAR studies, Hansch method, Free-Wilson method, Advantages and disadvantages of free approach, Computer based methods of QSAR related to receptor binding, Physico-Chemical properties, Lipophilicity, Electronic parameters, Steric substituent constants, Experimental determination of partition coefficients. Structure based drug design: i) Process of structure-based drug design, ii) Deactivation of certain drug, iii) Determination of the structure of the protein, iv) Design of inhibitors. Molecular modelling using computers. i) Introduction ii) Uses of molecular modeling: a) Manual use, b) Further-computer programming, c) X-ray crystallography. Pharmacokinetics and Pharmacodynamics. A] Pharmacokinetics: a) Drug absorption, b) Distribution, c) Elimination, d) Disposition. B] Pharmacodynamics. a) Introduction, Elementary treatment of enzyme inhibition, b) Membrane active drug, c) Sulphonamides Mechanism of action of following drugs: Action of CNS disorder, inflammation, cardiac dysfunction. MC-4: Drug metabolism.	Classification and Nomenclature of Drugs. Medicinal chemistry: Important terminology in medicinal chemistry. Classification and Nomenclature of Drugs. Concept of prodrugs and soft drugs. a) Prodrugs: i) Prodrugs designing, types of prodrugs. Prodrug formation of compounds containing various chemical groups, Prodrugs, and drug delivery system b) Soft drugs: i) Soft drug concept ii) Properties of soft drug. Theories of drug activity: i) Occupancy theory, ii) Rate theory, iii) Induced theory. QSAR method: Introduction, Methods used in QSAR studies, Hansch method, Free-Wilson method, Advantages and disadvantages of free approach, Computer based methods of QSAR related to receptor binding, Physico-Chemical properties, Lipophilicity, Electronic parameters, Steric substituent constants, Experimental determination of partition coefficients. Structure based drug design: i) Process of structure-based drug design, ii) Deactivation of certain drug, iii) Determination of the structure of the protein, iv) Design of inhibitors. Molecular modelling using computers. i) Introduction ii) Uses of molecular modeling: a) Manual use, b) Further-computer programming, c) X-ray crystallography. Pharmacokinetics and Pharmacodynamics. A] Pharmacokinetics: a) Drug absorption, b) Distribution, c) Elimination, d) Disposition. B] Pharmacodynamics. a) Introduction, Elementary treatment of enzyme inhibition, b) Membrane active drug, c) Sulphonamides Mechanism of action of following drugs: Action of CNS disorder, inflammation, cardiac dysfunction. MC-4: Drug metabolism. Nucleic acids: Structure and function of physiologically important nucleotides (c-AMP, ADP, ATP) and nucleic acids (DNA and RNA), replication, genetic code, protein biosynthesis, mutation.	Revised	CO4	By the recommendations of Dean (Academics), industry personal, alumni and Parents to meet the industrial needs.	25%

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				Chemical synthesis of oligonucleotides: Phosphodiester, Phosphotriester, Phosphoramidite and H-phosphonate methods including solid phase approach.				
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*CV*  
*23/10/20*

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## Koneru Lakshmaiah Education Foundation

(Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

Accredited by NAAC as 'A' Grade University ♦ Approved by AICTE ♦ ISO 9001-2015 Certified

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### DEPARTMENT OF CHEMISTRY Department Academic Committee (DAC) Minutes of Meeting, A.Y. 2021-22

The DAC meeting was conducted on 17<sup>th</sup> March 2022 at 2.00 PM in F102.

#### Agenda:

- Welcome Address
- Review of Mission and Vision of the Department statements
- Merging of Design Thinking and Innovation (DTI)-1 & 2 courses as Design Thinking and Innovation as a single course in Y22 M. Sc Chemistry Curriculum
- To review and finalize the course structure of M. Sc Chemistry 2022 admitted batch.
- Improving Industry Collaboration to improve placement opportunities for the students.
- Minor degree requirements other than M. Sc Chemistry students.
- Include value-added, skill development, employability, entrepreneurship, and work-in lieu courses for the AY 2022-23
- Consideration & Discussion of Feedback from students, Academic peers, parents, industry experts & Alumni.
- Any other item with the permission of the chair Any other item with the permission of the chair

The following members were present:

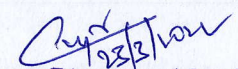
1	Dr. J.V.Shanmukha Kumar	Head of the Department
2	Dr. K.R.S.Prasad	Professor & Student Affairs (Advisor)
3	Dr. T.Bhaskara Rao	Assistant Professor & RPAC
4	Dr. Pradeep Kumar Brahman	Assistant Professor & Assoc. Dean
5	Dr. A.Venkateswara Rao	Assistant Professor & Professor in Charge
6	Ms. A. Gayathri	M.Sc Student
7.	Mr.M. Sudhakar	M.Sc Student

The meeting started with an address by Prof.J.V.Shanmukha Kumar (HOD, Chemistry Department) extending a warm welcome to the department academic Committee members present for the meeting.

The following points were discussed and resolved:

#### ITEM NO 1: Discussing Vision and Mission of the department.

Prof.J.V.Shanmukha Kumar, HoD, presented the Vision and Mission statements to the DAC members. Followed by the presentation, brief discussion was made on the statements.

  
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### **Vision of the Chemistry Department**

To impart quality higher education in all branches of Chemistry along with excellence in research to provide manpower to multi sectoral Industries, Research Institutions and Academia

### **Mission of the Chemistry Department**

- (iv) Propagation of higher education in Chemistry and provide wider job opportunities.
- (v) Prepare competitive and professional postgraduates and researchers, having sound knowledge of basics and applied chemistry for the betterment of society.
- (vi) Strengthen Industry – Academia relationship to catalyze innovation and growth in technology.

### **ITEM NO 2: Merging of Design Thinking and Innovation (DTI)-1 & 2 courses as Design Thinking and Innovation as a single course in Y21 M. Sc Chemistry Curriculum**

Resolution: As per the instructions from Dean, Academics, DTI-1 & 2 courses are merged as Design Thinking and Innovation (21UC1023) which is to be included in Y21 Curriculum. The credits of the courses adjusted accordingly and recommended to BOS.

### **ITEM NO 3: To review and finalize the modified course structure M. Sc Chemistry 2021 admitted batch.**

Resolution: Reviewed the new courses, revised courses, finalized, and recommended to BOS the Y22 course structure.

### **ITEM NO 4: Improving Industry Collaboration to improve placement opportunities for the students.**

**Resolution: The faculty suggested the following statements to:**

- (v) Arrange corporate guest lectures by industry experts.
- (vi) Arrange industry visits at least once in a semester.
- (vii) Skill assessment tests can be conducted by industry experts.
- (viii) Connect with the alumni who are in the industry and ask them to arrange on-campus placements.

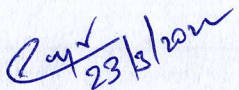
### **ITEM NO 5: Proposed to include Minor degree certificate courses offered by M. Sc Chemistry to the other departments for the A.Y. 2022-23 batch.**

Resolution: It is resolved that to offer Minor degree certificate courses to other department students with 20 credits in a discipline other than his/her major discipline.

### **ITEM NO 6: Proposed to include value-added, skill development, employability, entrepreneurship, and work-in lieu courses for the AY 2022-23.**

**Resolution:** It is resolved and to enhance employability of the students, value-added, skill development, employability, entrepreneurship, and work-in lieu courses are already included in the existing curriculum.

The meeting ended with a vote of thanks proposed by Dr. A. Venkateswara Rao, Assistant Professor, and Department of Chemistry.

  
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