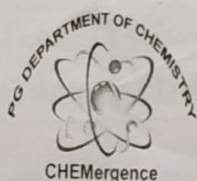


PG DEPARTMENT OF CHEMISTRY

SYLLABUS

BOS MINUTES

2021-2023 Batch



Dr. K. POONKODI, M.Sc., M.Phil., Ph.D.

Mrs. K. VIMALADEVI, M.Sc., M.Phil., (Ph.D)

Ms. R. MINI, M.Sc., M.Phil., (Ph.D)

Dr. V. PRABHU, M.Sc., Ph.D.

Mrs. M. ANUSUYA, M.Sc., M.Phil., (Ph.D)



NGM COLLEGE (Autonomous)

Affiliated to Bharathiar University

Re-Accredited by NAAC & ISO 9001:2015 certified

90, Palghat Road, Pollachi- 642001, Coimbatore (Dist.)

Phone: 04259-234868. 234870 Fax: 04259-234869

Website: www.ngmc.org

K. P. L.

Dr. K. POONKODI
HEAD
PG DEPARTMENT OF CHEMISTRY (SF)
NGM COLLEGE, POLLACHI



Nallamuthu Gounder Mahalingam College, Pollachi

(Autonomous, Affiliated to Bharathiar University, Coimbatore
ISO2009:2015 certified Institution, Reaccredited by NAAC)



POST GRADUATE DEPARTMENT OF CHEMISTRY

7TH BOARD OF STUDIES MEETING

DATE & TIME: 22.05.2021; 10.00 am

AGENDA

BoS / MSc Chem 7.1	:	Welcome address and Opening Remarks by Chairman, Board of studies in the POST GRADUATE DEPARTMENT OF CHEMISTRY
BoS / MSc Chem 7.2	:	Confirmation of the Minutes of the 6 th / Previous meeting of Board of studies in the Post Graduate Department of Chemistry held on 22 /02/2020 and Action taken report of 6 th meeting of Board of studies
BoS / MSc Chem 7.3	:	Discussion on Syllabus of I MSc CHEMISTRY under Regulation 2021-2022 Discussion on Syllabus of II MSc CHEMISTRY under Regulation 2022-2023 Discussion on Non Major Elective courses Regulation 2021-2023 Discussion on value added course Discussion on certificate course Discussion on MOOC online courses Any other discussions if any
BoS / MSc Chem 7.4	:	Suggestion given by BOS Members
BoS / MSc Chem 7.5	:	Any other items

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POST GRADUATE DEPARTMENT OF CHEMISTRY
MINUTES OF BOS MEETING

The 7th Meeting of the Board of studies of the **POST GRADUATE DEPARTMENT OF CHEMISTRY** was held on 22.05.2021 at 10.00 a.m. by online mode.

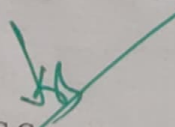
1. The following members were present:

1.	Dr.K.Poonkodi Assistant Professor & Head, PG Department of Chemistry, NGM College, Pollachi Mobile: 9842990353 poonks.che@gmail.com	Chairman
2.	Mrs.K.Vimaladevi Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 9865222985 k.vimala83@gmail.com	Internal Members
3.	Mrs.R.Mini Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 9952602887 goms.minil@gmail.com	
4.	Dr.V.Prabhu Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 8594061663 prabhunmr@gmail.com	
5.	Mrs.M.Anusuya Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 7907923146 anusuyamk@gmail.com	
6.	Dr. S. Ponnusamy Associate Professor & Head, Department of Chemistry, Government Arts College Coimbatore, Tamilnadu. Mobile: 9244645744 kspons2001@gmail.com	University Nominee


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7.	Dr. S. Ravi Professor & Head Department of Chemistry Karpagam Institute of Higher Education Coimbatore-641-021 Mobile: 9047174142 ravisubban@rediffmail.com	Academic Auditor
8.	Dr. I. V. Muthu Vijayan Enoch Associate Professor Nanoscience & Technology Karunya Institute of Technology and Sciences, Coimbatore, Tamilnadu. Mobile: 9486891717 israelenoch@karunya.edu	Subject Expert
9.	Mr. Rajan Subramaniam Technical Director EPIC COATING ACADEMY, Kinathukadvu, Coimbatore. Mobile: 9790700495 rajan@thebkgroups.com	Industrial Expert
10.	Mr. S. Vasantha Mohan Chemist Suguna Foods Pvt Ltd Varatharajapuram, Udumalpet Taluk. Mobile: 9080744895 vsanthchemist96@gmail.com	Alumnus
11.	S. Athira II-MSc Chemistry Mobile: 9207077547 athiraappallam@gmail.com	Student representative

K.P.LL
HoD


CDC Co-ordinator


COE


PRINCIPAL
PRINCIPAL
N. G. M. COLLEGE, POLLACHI

Dr. K. POONKODI
HEAD
PG DEPARTMENT OF CHEMISTRY (SF)
NGM COLLEGE, POLLACHI

K. SRINIVASAN, M.C.A.
Co-ordinator
Curriculum Development Cell (CDC)
NGM College (Autonomous)
Pollachi - 642 001.

Dr. R. MANICKA CHEZIAN, M.Sc., M.S., Ph.D.,
Controller of Examinations
NGM College (Autonomous)
POLLACHI - 642 001.

BoS/MSc Chem7.1 WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN, BOARD OF STUDIES IN THE POST GRADUATE DEPARTMENT OF CHEMISTRY

The Chairman, BoS of the Post Graduate Department of Chemistry welcomed and introduced the members of 7th Board of Studies and thanked each one of them for sparing their valuable time to attend the meeting.

BoS/MSc Chem7.2. TO CONFIRM THE MINUTES OF 7th BOS MEETING HELD ON 22.5.2021. The minutes of the 6th Board of Studies meeting held on 22.02.2020 were communicated to the members. The comments received have been incorporated and placed for confirmation. The same was approved by the PREVIOUS ACADEMIC MEETING NO Academic council.

~ Action Taken Report (Enclosed in Annexure 1)

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HEAD
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BoS/M.Sc Chem 7.3

BoS/M.Sc chem 7.3.1 - Syllabus

I MSc CHEMISTRY (I - SEMESTER)

✦ Major Core Paper Code & Name

- 21PCY101- Inorganic Chemistry –I- Solid state and Nuclear Chemistry
- 21PCY102 - Organic Chemistry – I- Reactions and Mechanisms
- 21PCY103 - Physical Chemistry –I- Group Theory and Chemical Kinetics

✦ Non Major Elective -I

- 21PCY1N1 - Non Major Elective-I - Chemistry in day to day life

I MSc CHEMISTRY (II - SEMESTER)

✦ Major Core Paper Code & Name

- 21PCY204 - Inorganic Chemistry –II-Coordination and Organometallic Chemistry
- 21PCY205 - Organic Chemistry-II –Organic Reactions and Stereochemistry
- 21PCY206 - Physical Chemistry-II – Quantum Mechanics and Electrochemistry

✦ Major Elective -I

- 21PCY2EA - Major Elective –I – Green, Nanochemistry & Cyber Security
- 21PCY2EB - Major Elective –I- Food Science and Technology
- 21PCY2EC - Major Elective –I - Advanced polymeric materials

✦ Non Major Elective -II

- 21PCY2N2 - Non-Major Elective-II - Chemistry in mankind

✦ Practicals

- 21PCY207 - Inorganic Chemistry Practical –I
- 21PCY208 – Organic Chemistry Practical – I
- 21PCY209 – Physical Chemistry Practical - I

1. The presented syllabus was accepted by the experts and a few suggestions were given as follows:
The syllabus was well structured and frequently updated according to the current advances. More focus can be given for laboratory practice in research areas like spectroscopic and chromatographic techniques. Non major elective can be oriented. The content of some papers

Dr.K.POONKODI

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seems more topics are included; it will be difficult for the teacher and students to complete within the prescribed time and workload, so recommended to reduce few topics.

2. The following papers from M.Sc Chemistry were accepted by the experts fully without further suggestions:

- 21PCY101- Inorganic Chemistry –I- Solid state and Nuclear Chemistry
- 21PCY103 - Physical Chemistry –I- Group Theory and Chemical Kinetics
- 21PCY1N1 - Non Major Elective-I - Chemistry in day to day life
- 21PCY204 - Inorganic Chemistry –II-Coordination and Organometallic Chemistry
- 21PCY2EA - Major Elective –I – Green, Nanochemistry & Cyber Security
- 21PCY2EC - Major Elective –I - Advanced polymeric materials
- 21PCY2N2 - Non-Major Elective-II - Chemistry in mankind
- 21PCY207 - Inorganic Chemistry Practical –I
- 21PCY209 – Physical Chemistry Practical - I

3. The following courses were revised with major / minor modifications

- 21PCY208 – Organic Chemistry Practical – I (**minor**)
- 21PCY2EB - Major Elective –I- Food Science and Technology (**major**)

New Course Added:

- 21PCY1N1 - Non Major Elective-I - Chemistry in day to day life
- 21PCY2N2 - Non-Major Elective-II - Chemistry in mankind

The following papers from M.Sc Chemistry were accepted by the experts fully without further suggestions

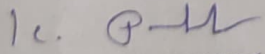
BoS/M.Sc Chem7.3.2 - Syllabus

II MSc CHEMISTRY (III - SEMESTER)

✦ **Major Core Paper Code & Name**

- 21PCY310 - Organic Chemistry –III – Natural products and Organic reagents
- 21PCY311 - Physical Chemistry –III -Classical and Statistical Thermodynamics
- 21PCY312 - Spectroscopic Techniques- Application in Organic Chemistry

✦ **Major Elective -II**


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- 21PCY3EA - Applied Electrochemistry
- 21PCY3EB - Nanoscience and Nanotechnology
- 21PCY3EC - Dye chemistry

• Advanced Learners

- 21PCY3AL - (Advanced learners) - Advanced functional materials / MOOC

✦ Non Major Elective -III

- 21PCY3N3 - Non Major Elective-III - Chemistry In Context

II MSc CHEMISTRY (IV - SEMESTER)

✦ Major Core Paper Code & Name

- 21PCY413 - Inorganic Chemistry -III: Bioinorganic and Inorganic Photochemistry
- 21PCY414 - Analytical Techniques

✦ Major Elective -III

- 21PCY4EA - Medicinal Chemistry
- 21PCY4EB - Computational Chemistry
- 21PCY4EC - Green Chemistry

✦ Practicals

- 21PCY415 - Inorganic Chemistry Practical -II
- 21PCY416 - Organic Chemistry Practical - II
- 21PCY417 - Physical Chemistry Practical - II

✦ Project

- 21PCY418 - Project Work & Viva-Voce

✦ Value Added Course

- 21PCY3V01-Value Added Course - I - Cosmetics Chemistry- An introduction
- 21PCY4V02- Value Added Course - II - Chemistry of Industrial Process: An Introduction

✦ Certificate Course

- 21PCYC01-Fundamentals of Pharmaceutical Chemistry.
- 21PCYC02-Phytochemical Techniques and Health Chemistry

1. The presented syllabus was accepted by the experts and a few suggestions were given as follows:

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<<21PCY310 - Organic Chemistry -III - Natural products and Organic reagents -To introduce Retrosynthetic analysis, protection and deprotection as a third unit and shift the heterocyclic compounds to fifth unit>>

2. The following papers from M.Sc Chemistry were accepted by the experts fully without further suggestions:

- 21PCY311 - Physical Chemistry -III - Classical and Statistical Thermodynamics.
- 21PCY312 - Spectroscopic Techniques - Application in Organic Chemistry.
- 21PCY3EA - Major Elective -II - Applied Electrochemistry
- 21PCY3EB - Major Elective - II - Nanoscience and Nanotechnology
- 21PCY3EC - Major Elective - II - Dye Chemistry
- 21PCY3AL - (Advanced learners) - Advanced functional materials / MOOC
- 21PCY3N3 - Non Major Elective-III - Chemistry In Context
- 21PCY414 - Analytical Techniques
- 21PCY4EC - Green Chemistry
- 21PCY415 - Inorganic Chemistry Practical -II
- 21PCY417 - Physical Chemistry Practical -II
- 21PCY418 - Project Work & Viva - Voce

✦ Value Added Course

- 21PCY3V01-Value Added Course - I - Cosmetics Chemistry- An introduction
- 21PCY4V02- Value Added Course - II - Chemistry of Industrial Process: An Introduction

✦ Certificate Course

- 21PCYC01-Fundamentals of Pharmaceutical Chemistry.
- 21PCYC02-Phytochemical Techniques and Health Chemistry

3. The following courses were revised with major / minor modifications.

- 21PCY4EA - Medicinal Chemistry(**major**)
- 21PCY4EB - Computational Chemistry(**major**)
- 21PCY416 - Organic Chemistry Practical - II (**minor**)

J. C. P. H.

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New Course Added:(IF ANY)

- 21PCY3EB – Major Elective – II – Nanoscience and Nanotechnology
- 21PCY4EB - Computational Chemistry (**major**)
- 21PCY4EC – Green Chemistry
- 21PCY3AL - (Advanced learners) - Advanced functional materials / MOOC
- 21PCY3N3 - Non Major Elective-III - Chemistry In Context

The following papers from M.Sc Chemistry were accepted by the experts fully without further suggestions

Nil

✦ **Certificate Course – I**

- 21PCYC01-Fundamentals of Pharmaceutical Chemistry

✦ **Certificate Course – II**

- 21PCYC02-Phytochemical Techniques and Health Chemistry

These changes have been made effect for the students admitted in 2021-2023 with Semesters - I –IV accordingly.

BoS/M.Sc Chem 7.4 OVER ALL SUGGESTIONS GIVEN BY THE BoS MEMBERS

7.4.1: The board deliberated and carefully revised the contents of the courses offered for MSc Chemistry in tune current developments in the domains of chemistry.

7.4.2: Present syllabi is designed with a focus on enhancing employable skills with special reference to NET/ JRF and other competitive examinations.

7.4.3: The programme outcomes and programme specific outcomes and course objectives have been designed and approved by Board which is in tune with vision and mission of the institution and its graduate attributes.

7.4.4: Two Additional NME Papers offered to other Departments also finalized.

7.4.5: The board resolved to adopt MOOC/NPTEL/SWAYAM courses for second and third semester with due approval of the authorities.

7.4.6: Members of board of studies reviewed and revised the list of Value added courses and Certificate courses

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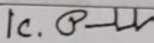
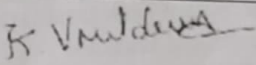
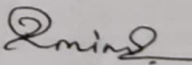
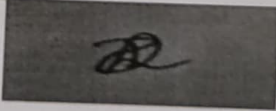
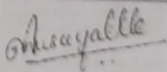
7.4.7: The Board of Studies authorized the list of subject experts for Question paper setting, paper valuation and practical examination.

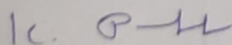
7.4.8: The Pattern of Examination and the Distribution of Marks for MSc Degree also approved. The members had a brainstorming discussion and interaction among themselves. After discussion, fruitful suggestions were incorporated appropriately in the Curriculum and Syllabi.

Based on the suggestions given by the members, BOS resolved to recommend the following to the Academic Council for further approval.

- The syllabus of First Year M.Sc Chemistry under Regulation 2021 - 2022.
- The syllabus of Second Year M.Sc Chemistry under Regulation 2022 - 2023

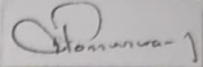
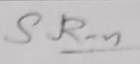
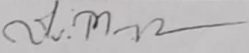
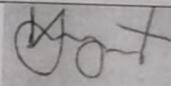
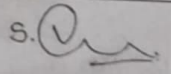
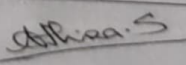
Members Present:

Chairman	
Dr.K.Poonkodi Assistant Professor & Head, PG Department of Chemistry, NGM College, Pollachi Mobile: 9842990353 poonks.che@gmail.com	
Internal Members	
Ms.K.Vimaladevi Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 9865222985 k.vimala83@gmail.com	
Ms.R.Mini Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 9952602887 goms.minil@gmail.com	
Dr.V.Prabhu Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 8594061663 prabhunmr@gmail.com	
Ms.M.Anusuya Assistant Professor PG Department of Chemistry, NGM College, Pollachi Mobile: 7907923146 anusuyamk@gmail.com	
University Nominee	



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<p>Academic Experts</p>	
<p>Dr. S. Ravi Professor & Head Department of Chemistry Karpagam Institute of Higher Education Coimbatore-641-021 Mobile: 9047174142 ravisubban@rediffmail.com</p>	
<p>Dr. I. V. Muthu Vijayan Enoch Associate Professor Nanoscience & Technology Karunya Institute of Technology and Sciences, Coimbatore, Tamilnadu. Mobile: 9486891717 israelenoch@karunya.edu</p>	
<p>Industrial Experts</p>	
<p>Mr. Rajan Subramaniam Technical Director EPIC COATING ACADEMY, Kinathukadavu, Coimbatore. Mobile: 9790700495 rajan@thebkgroups.com</p>	
<p>Alumnus nominated by Principal / HoD</p>	
<p>Mr. S. Vasantha Mohan Chemist, Suguna Foods Pvt Ltd Varatharajapuram, Udumalpet Taluk. Mobile: 9080744895 vsanthchemist96@gmail.com</p>	
<p>Special Invitees if any</p>	
<p>NIL</p>	<p>nil</p>
<p>Student Members</p>	
<p>S. Athira II-MSc Chemistry Mobile: 9207077547 athiraappallam@gmail.com</p>	

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ANNEXURE I

Minutes of the 6th/ Previous Meeting – Action Taken Report

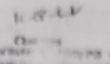

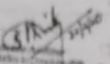



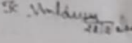
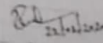
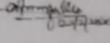
S.No	Suggestion given by expert members	Action taken
1.	PO's, PSO, CO's are updated and PEO's are added	Reviewed and Implemented
2.	Inorganic chemistry- I must be revised	Revised
3.	In the Value added courses, credit points are given for the syllabus scheme.	Implemented
4.	In the Spectroscopic techniques paper, the title was changed as Applications in Organic Chemistry	Implemented
5.	Reference, Text books of latest edition was added	Implemented
6.	Video and Open source links are added.	Implemented
7.	New Course introduced for advanced learners as Advanced Functional materials	Implemented
8.	Self-study portion included in each unit entire syllabus for SET/ NET Requirements to motivate advanced learners.	Implemented
9.	In practicals waste should be minimized	Implemented
10.	Project hours must be included in the syllabus	Implemented
11.	Elective paper-I- some portions must be rearranged	Implemented
12.	Elective paper-III-medicinal chemistry self-study portions may be modified	Implemented

Dr. K. POONKODI

HEAD

PG DEPARTMENT OF CHEMISTRY (SF)
NGM COLLEGE, POLLACHI

BOARD OF STUDIES IN M.Sc CHEMISTRY - 22.02.2020

Sl.No	MEMBERS	SIGNATURE
1.	Dr. K. POONKODI (CHIEF PERSON) Assistant Professor & Head, PG Department of Chemistry NGM College, Pollachi	
2.	Dr. S. PANIGRABHY (UNIVERSITY MEMBER) Associate Professor, Department of Chemistry Guru Nanak College, Coimbatore - 641018	
3.	Dr. K. P. ELANGO (ACADEMIC EXPERT) Professor, Department of Chemistry Gandhigram Rural Institute (Former Tamil University), Dindigul	
4.	Dr. S. RAJ (EXPERT EXPERT) Professor & Head, Department of Chemistry Kannappan Academy of Higher Education Coimbatore	
5.	Mrs. S. ELAMARAN (INDUSTRIAL EXPERT) Branch Manager - GC Cikan Car Industries, 29/2A-2B Amar Jothi Nagar, JHS Colony, Coimbatore	
6.	Dr. V. PRABHU Assistant Professor, PG Department of Chemistry NGM College, Pollachi	
7.	Ms. K. VIMANJSEVI Assistant Professor, PG Department of Chemistry NGM College, Pollachi	
8.	Ms. R. M. VI Assistant Professor, PG Department of Chemistry NGM College - Pollachi	
9.	Ms. M. BRISHTHA Assistant Professor, PG Department of Chemistry NGM College, Pollachi	

The members of board of studies met on 22/2/2020 the syllabi to the PG Practical and Project were thoroughly discussed the previous suggestions in the syllabi were incorporated and the correction were noticed

THE FOLLOWING POINTS ARE CHANGED IN THE BOARD OF STUDIES

1. Course Outcomes are changed according to the syllabus revision
2. Included five course Outcomes, Programme Outcomes and Programme Specific Outcomes
3. Programme Specific Outcome designed to enable students for the higher learning, employability and entrepreneurship
4. Subject expert and didactic modules suggest the following changes.
 - The components of internal are changed to usage
 - The test - I and Test-II will mandatory (without writing tests the students can easily score required maximum 12 marks by seeing other components)
 - The compulsory question (Question Number -16) in Section - C can be designed as a separate sub-question
 - Section - C may be choice based.
 - Programme outcome should be included and mapping will be with CO and PO (shown shown)
 - For value added courses the grade may be given not completed or incomplete
 - In practicals the credit and contact hours are included in every semester.
 - Inorganic Chemistry - II as main subject not as elective
 - In project, examination hours may be removed
 - 10 references, one foreign books must be included
 - 10 text books, the text books for study and books for reference changed to text books and reference books
 - In organic Chemistry Practical I, for main zero hydrogen chemicals, but separation is removed and removed and only part left it enough
 - Subject wise list of examine may be included
 - Project hours included in the syllabus
 - In spectroscopic Techniques - Charge Transfer Absorption Spectroscopy

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5. New course introduced for Advanced learners, Physical chemical techniques and health chemistry
6. Self study portion included in each unit in entire syllabus for 50/100 requirements to motivate advanced learners
7. Revise 30% of entire syllabus
8. The scheme, COs, methodology and evaluation are changed for final semester project.
9. 80% of the syllabus is correlated to 100% NEP Syllabus

CHANGES MADE DURING SYLLABUS REVISION

- References and text books of latest editions are added.
- Video links and open source links are added

The continuous Internal Assessment (CIA) components for the academic year are modified as,

1. Test - I (50% of Syllabus)	= 70 marks
2. Test - II (Remaining 50% of Syllabus)	= 70 marks
3. Assignment	= 20 marks
4. Seminar/Tutorial	= 20 marks
5. Knowledge Enhancement	= 20 marks
6. Information Acquisition	= 10 marks

Total = 280 marks
 $\frac{210}{7}$ = 30 marks [as Internal]

Changes in SEMESTER - I

- In Organic Chemistry - I (Reactions and mechanism) all units are revised. Tautomerism and many naming reactions are also included
- In Physical Chemistry - I (Group theory and Crystal field theory) Unit - V, Kinetics of Polymerization is replaced by fundamentals of photochemistry

Changes in SEMESTER - II

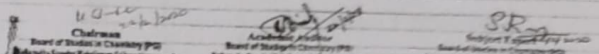
- In Inorganic Chemistry - II (Coordination and Organometallic chemistry) of unit - I; magnetic properties of first row transition metal complexes is included whereas of d-d orbital substitution is removed from the unit






Changes in SEMESTER - III

- In Major Elective - I (Spectroscopy) some contents are rearranged for continuity with minor revision
- In Major Elective - II (Green, Nano Chemistry and Cyber Security), E-Journals, Plagiarism, IPR, Trade and copyright are added.

Changes in SEMESTER - IV

- Major Elective - III (Medicinal Chemistry) Self study portions are modified


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-  [Mr. S. Lakshmanan, Industrial Expert]
-  [Dr. V. Prabhu, Assistant Professor]
-  [Ms. K. Vimaladevi, Assistant Professor]
-  [Ms. R. Mohi, Assistant Professor]
-  [Ms. M. Anusuya, Assistant Professor]

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II - Qu

**List of Courses having focus on local, national, regional and global developmental needs offered by
the M.Sc Chemistry**

M.Sc CHEMISTRY						
Programme: M.Sc., Chemistry					Year: 2021-2023	
Course Code	Course Title	Need				Rationale
		Local	National	Regional	Global	
21PCY101	Inorganic Chemistry -I- Solid state and Nuclear Chemistry	✓	✓	✓	✓	Smart materials/ Competitive examination like, SET/NET/GATE/ JAM/ TNPSC/ novel energy material synthesis
21PCY102	Organic Chemistry – I- Reactions and Mechanisms	✓	✓	✓	✓	New innovative compounds can be synthesized by using the mechanisms like antiviral, anti-cancer drugs
21PCY103	Physical Chemistry -I- Group Theory and Chemical Kinetics	✓	✓	✓	✓	Competitive exams, rate of the reaction are useful for studying the reaction.
21PCY1N1	*Non Major Elective-I Chemistry in day to day life	✓	✓	✓	✓	To control the pollutions and reduction of plastic usage
21PCY204	Inorganic Chemistry -II-Coordination and Organometallic Chemistry	✓	✓	✓	✓	Anti-cancer drugs, antipyretic and other drugs can be synthesized, biomedical applications
21PCY205	Organic Chemistry- II –Organic Reactions and Stereochemistry	✓	✓	✓	✓	Stereo specific and regio selective drugs can be synthesized, Pharmaceutical importance
21PCY206	Physical Chemistry-	✓	✓	✓	✓	Competitive exams/scientific computation of

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	II – Quantum and Electrochemistry					molecular energy /simulation/docking/ molecular modelling studies / energy materials/ corrosion control
21PCY2EA	Major Elective –I * Green, Nanochemistry	✓	✓	✓	✓	Greener methods and nanoscale materials can be prepared with enormous energy efficient devices and battery materials, semiconductors, solar cells/ current needs/
21PCY2EB	&Cyber Security					
21PCY2EC	*Food Science and Technology * Advanced Polymeric Materials					
21PCY2N2	* Non-Major Elective-II Chemistry in mankind	✓	✓	✓	✓	Inter disciplinary helpful to know the chemistry behind the materials/ competitive exams
21PCY207	Inorganic Chemistry Practical –I	✓	✓	✓	✓	New skills are helpful to improve the efficiency and manage time during newer materials preparation
21PCY208	Organic Chemistry Practical –I	✓	✓	✓	✓	
21PCY209	Physical Chemistry Practical –I	✓	✓	✓	✓	
21PCY310	Organic Chemistry – III– Natural Products and Organic Reagents	✓	✓	✓	✓	Competitive exams/ preparation of relevant drugs using natural products by semi synthetic path way/ isolation of phytochemicals.
21PCY311	Physical Chemistry –III – Classical and Statistical Thermodynamics	✓	✓	✓	✓	Helpful to know the mechanism of automobiles and its efficiency/petrochemicals
21PCY312	Spectroscopic Techniques –	✓	✓	✓	✓	Helpful to characterize the structures of newly prepared inorganic and organic materials

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	Application in Organic Chemistry					
21PCY3EA 21PCY3EB 21PCY3EC	Major Elective –II * Applied Electrochemistry * Nanoscience and Nanotechnology *Dye chemistry	✓	✓	✓	✓	Helpful to reduction of various pollutants, and increase the efficiency of newer materials as prepared
21PCY3AL	Advanced functional materials / MOOC	✓	✓	✓	✓	Newer functional materials for energy storage and devices/ lifelong learning
21PCY3N3	Non Major Elective-III Chemistry In Context	✓	✓	✓	✓	Awareness of environment/ paints/ fuels composition/ Helpful to write Competitive exams by other major students
21PCY413	Inorganic Chemistry –III- Bioinorganic and Inorganic Photo Chemistry	✓	✓	✓	✓	Competitive exams/ greener synthesis/ medicinal applications/ catalyst/ role metals in biological systems.
21PCY414	Analytical Techniques	✓	✓	✓	✓	Useful for characterization of materials/ compounds/ separation techniques/ biological activities like antioxidant, anticancer activities.
21PCY4EA 21PCY4EB 21PCY4EC	Major Elective –III * Medicinal Chemistry *Computational chemistry * Green Chemistry	✓	✓	✓	✓	Drugs and their structure activity relationship will help to know the mechanism of action of newer drugs/ scientific computation of molecular energy / simulation/docking/ molecular modelling studies / smart materials.
21PCY415	Inorganic Chemistry Practical –II	✓	✓	✓	✓	New skills are helpful to improve the efficiency and manage time during newer materials preparation
21PCY416	Organic Chemistry Practical –II	✓	✓	✓	✓	

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1PCY417	Physical Chemistry Practical –II	✓	✓	✓	✓	
21PCY418	Project Work & viva voce	✓	✓	✓	✓	Helps to identify the potential of students as scientist and chemists/ able to develop and design next generation materials for benefit of society.
21PCY3V0 1	Value Added Course – I Cosmetics Chemistry- An introduction	✓	✓	✓	✓	Health care and beauty products
21PCY4V0 2	Value Added Course – II Chemistry of Industrial Process: An Introduction	✓	✓	✓	✓	Treatment of wastewater leads to recycle and reduction of waste/ environmental consciousness.
21PCYC01	Certificate Course – I Fundamentals of Pharmaceutical Chemistry	✓	✓	✓	✓	Pharma related products/ Drugs and their structure activity relationship will help to know the mechanism of action of newer drugs.
21PCYC02	Certificate Course – II Phytochemical Techniques and Health Chemistry	✓	✓	✓	✓	Newer techniques to isolate natural products/ Able to design the scheme for synthesis of isolated products.

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**List of Courses having focus on employability/ entrepreneurship/ skill development offered by the
M.Sc Chemistry**

M.Sc CHEMISTRY						
Programme:					Year:	
Course Code	Course Title	Employability (EM) / Entrepreneurship (EN) / Skill Development (SD)			Focus	Year of Introduction
		EM	EN	SD		
21PCY101	Inorganic Chemistry –I- Solid state and Nuclear Chemistry	✓	✓	✓	✓	2017
21PCY102	Organic Chemistry – I- Reactions and Mechanisms	✓	✓	✓	✓	2017
21PCY103	Physical Chemistry –I- Group Theory and Chemical Kinetics	✓	✓	✓	✓	2017
21PCY1N1	*Non Major Elective-I Chemistry in day to day life	✓	✓	✓	✓	2015
21PCY204	Inorganic Chemistry –II-Coordination and Organometallic Chemistry	✓		✓	✓	2017
21PCY205	Organic Chemistry-II –Organic Reactions and Stereochemistry	✓	✓	✓	✓	2017
21PCY206	Physical Chemistry-II – Quantum and Electrochemistry	✓		✓	✓	2019
21PCY2EA	Major Elective –I * Green, Nanochemistry & Cyber Security	✓	✓	✓	✓	2017
21PCY2EB	*Food Science and Technology					2019
21PCY2EC	* Advanced Polymeric Materials					2021
21PCY2N2	* Non-Major Elective-II Chemistry in mankind	✓		✓	✓	2021
21PCY207	Inorganic Chemistry Practical -I	✓	✓	✓	✓	2015
21PCY208	Organic Chemistry Practical -I	✓		✓	✓	2015
21PCY209	Physical Chemistry Practical -I	✓	✓	✓	✓	2015
21PCY310	Organic Chemistry – III– Natural Products and Organic Reagents	✓	✓	✓	✓	2015
21PCY311	Physical Chemistry –III –Classical and Statistical Thermodynamics	✓		✓	✓	2015
21PCY312	Spectroscopic Techniques – Application in	✓	✓	✓	✓	2017

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	Organic Chemistry					
	Major Elective –II					
21PCY3EA	*Applied Electrochemistry	✓	✓	✓	✓	2017
21PCY3EB	* Nanoscience and Nanotechnology					2021
21PCY3EC	*Dye chemistry					2019
21PCY3AL	Advanced functional materials / MOOC	✓	✓	✓	✓	2021
21PCY3N3	Non Major Elective-III Chemistry In Context	✓	✓	✓	✓	2021
21PCY413	Inorganic Chemistry –III- Bioinorganic and Inorganic Photochemistry	✓	✓	✓	✓	2017
21PCY414	Analytical Techniques	✓	✓	✓	✓	2021
	Major Elective –III					
21PCY4EA	* Medicinal Chemistry	✓	✓	✓	✓	2020
21PCY4EB	*Computational chemistry					2021
21PCY4EC	* Green Chemistry					2021
21PCY415	Inorganic Chemistry Practical -II	✓	✓	✓	✓	2015
21PCY416	Organic Chemistry Practical -II	✓	✓	✓	✓	2015
21PCY417	Physical Chemistry Practical –II	✓	✓	✓	✓	2015
21PCY418	Project Work & viva voce	✓	✓	✓	✓	2015
21PCY3V0 1	Value Added Course – I Cosmetics Chemistry- An introduction	✓	✓	✓	✓	2020
21PCY4V0 2	Value Added Course – II Chemistry of Industrial Process: An Introduction	✓	✓	✓	✓	2020
21PCYC01	Certificate Course – I Fundamentals of Pharmaceutical Chemistry	✓	✓	✓	✓	2021
21PCYC02	Certificate Course – II Phytochemical Techniques and Health Chemistry	✓	✓	✓	✓	2021

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**PERCENTAGE OF REVISION OF M.SC CHEMISTRY SYLLABUS UNDER REGULATION
2021-23**

PG CHEMISTRY							
S. No	Course Code	Course Title	Change Details	% of Changes	Content Deleted	Content Updated	Reason for Change
	21PC Y101	Inorganic Chemistry – I- Solid state and Nuclear Chemistry	Unit V	20%	Radioactive and Counting techniques - tracer technique, neutron activation analysis, Particle acceleration: linear accelerator - cyclotron and synchrotron - betatron - G.M counter - proportional and scintillation counters. Radio Isotopes: Applications – isotopes as tracers – uses in structure and mechanistic studies – carbon dating, industry, medicine and agriculture- Hot-atom chemistry- Safety measures.	Nuclear Chemistry – II Type of nuclear reactions with natural and accelerated particles - transmutation - stripping and pick-up - spallation - fragmentation, etc. - fission - characteristics of fission reaction - product distribution and theories of fission - fissile and fertile isotopes - U235, U238, Th232 and Pu239 - atom bomb - nuclear fusion - stellar energy - synthesis of new elements - principles underlying the usage of radioisotopes in analysis - agriculture - industry and medicine - mechanism of chemical reactions - uses of radioisotopes in analytical chemistry - isotopic dilution analysis - neutron activation analysis and dating methods. Hot-atom chemistry-Safety measures.	Course Teacher
	21PC Y102	Organic Chemistry – I- Reactions	Unit-I	1%	nil	Guidelines for proposing reasonable mechanism – Energetics and energy	Course Teacher

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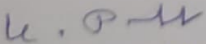
	and Mechanisms	Unit-IV	1%	nil	profile diagrams. Sharpless asymmetric epoxidation	
21PC Y103	Physical Chemistry – I- Group Theory and Chemical Kinetics	Unit I Unit V	5% 20%	Unit V Fundamentals of Photochemistry Physical properties of the electronically excited molecules- excited state dipole moment- geometry of some electronically excited molecules - types of photophysical pathways. Fluorescence emission – Phosphorescence – luminescence - Photophysical kinetics of unimolecular processes - Stern-Volmer equation – quenching - delayed fluorescence - study of excited states - flash photolysis, laser, maser and its applications.	Definition of matrix, square, diagonal, null, unit, row, column, symmetric matrices - Matrix multiplication (Commutative and non-Commutative) determination of inverse of a matrix, block multiplication of matrices – Addition Matrix representation of symmetry operations and subtraction of matrices – Matrix notations for symmetry operations of C _{2v} and C _{3v} point groups (use of vectors) Unit V Surface Chemistry Physisorption and Chemisorption – adsorption isotherm – derivation of Langmuir and Freundlich, derivation of B.E.T equation of multilayer adsorption – application of BET equation to surface area determination, derivation of Gibbs adsorption isotherm. Heterogeneous catalysis and their kinetics – chemical reactions on solid surfaces - Mechanism & Kinetics of	Course Teacher

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					unimolecular and bimolecular surface reactions – Langmuir – Hinshelwood, Langmuir – Ridel mechanism, ARRT of surface reactions.	
21PC Y1N1	*Non Major Elective-I Chemistry in day to day life	Unit II Unit III	50%	<p>Unit III Paints Paints, varnish and lacquers- ingredients, characteristics and their uses. Chemistry in Colouring Matter - Classification of Dyes on the Basis of Constitution.</p> <p>Unit IV Cleansing agents Cleansing agents - Soaps - classification, manufacture, dry cleaning-properties.</p> <p>Unit V Milk and Milk products: Milk and Milk products- composition of Milk; Flavour and aroma of Milk; Physical properties of Milk; milk products; Cream; butter; ice Cream; milk powder.</p>	<p>Unit II Essential Micronutrients Carbohydrates - Proteins - Lipids - Nucleic acids and Vitamins – Definition- Sources, Classification, Applications and Diseases due to deficiency.</p>	Course Teacher
21PC Y204	Inorganic Chemistry – II- Coordination and Organometallic Chemistry	Unit-II Unit-IV	5% 20%	<p>Nil</p> <p>Definition of organometallic compound - 18 electron rule - EAN rule - concept of hapticity - classification of organometallic compound - the metal carbon bond types - ionic bond - sigma covalent bond - electron deficient bond - dative bond.</p>	<p>spectra of Ti^{3+}, V^{3+}, Ni^{2+}, Cr^{3+}, Co^{2+}, Cr^{2+} and Fe^{2+}</p> <p>Classification of organometallic compound, concept of hapticity, Stability of organo metallic compounds- β hydrogen elimination- the sixteen and eighteen electron rule. Synthesis – structure and bonding in metal carbonyls – isoelectronic and isolobal analogy- use of IR in the structural elucidation of carbonyl compounds–</p>	Course teacher


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						metal carbonyls- metal carbonyl anions - metal carbonyl hydrides - metal carbonyl halides - metal carbonyl clusters – Wade's rule and isolobal relationship - metal nitrosyls - dinitrogen complexes - dioxygen complexes.	
21PC Y205	Organic Chemistry-II –Organic Reactions and Stereochemis try	Unit-I	5	Nil	Allylic oxidation - oxidation of alcohols, glycols, halides and amines to aldehydes and ketones. DIBAL and hydroboration.	Course Teacher	
		Unit-II	5	Nil		Excimer formation - chemiluminescence and bioluminescence. Experimental technique: Actinometry	Course Teacher
		Unit-III	Nil	Nil	Nil	Course Teacher	
		Unit-IV	6	Nil		Asymmetric synthesis: Cram's rule and Prelog's rule. Quantitative correlation between conformation and reactivity, Winstein - Eliel equation	Course Teacher
		Unit-V	6	Nil	General methods for		

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					determination of structure of alkaloids and lysergic acid, nicotine	
21PC Y206	Physical Chemistry-II - Quantum and Electrochemistry	Unit - I	2%	Nil	photo electric effect and Compton effect	Subject Expert
		Unit - II	0	excited state, He + in the ground state		
		Unit - III	2%	Nil		
		Unit-IV	60	Conductance - transport number Falkenhagen effect, Wein effect - ionic strength	charge distributions and bond orders from the coefficients of HMO	
		Unit-V	50	Current-voltage relationships - Voltametry - Polarography - mass transfer - diffusion limited currents - kinetic currents - adsorption currents - amperometry, coulometry, cyclic voltametry, rotating disc electrodes, chronoamperometry, chronopotentiometry, chronocoulometry	Electrochemistry - I Mean ion activity and activity coefficient of electrolytes in solution - ion association - ionic strength - strong and weak electrolytes - Debye theory of electrolytic conductance - electrochemical cells. Conductance - Applications of standard redox potentials	
					Electrochemistry-II The electrical double layer - polarizable and non-polarizable interfaces - structure of electrical double layer - double layer models - Helmholtz, Guoy-Chapman and Stern models. Kinetics of electrode processes - current-potential curve -	

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						Butler-Volmer relation and its approximations - symmetry factor and transfer coefficient - Tafel equation -charge transfer resistance - Nernst equation from Butler-Volmer equation -primary and secondary batteries -fuel cells - corrosion and its prevention methods Self-study: Corrosion control	
21PC Y2EA 21PC Y2EB 21PC Y2EC	Major Elective -I * Green, Nanochemistry & Cyber Security * Food Science and Technology * Advanced Polymeric Materials	Unit-III	20%	Journals, patents, journals of different fields of chemistry (organic, inorganic, physical, polymer, analytical and nano) - secondary sources- books, indexes, chemical abstracts, review articles - literature searching online. E-journal	Concepts of Research - Importance of research in science, Criteria of good research, Sources of a research problem. Types of research - Basic, applied, action, experimental, diagnostic and exploratory. Primary and secondary sources -N-list-journals, plagiarism, Intellectual property rights, patent, trade, Copyrights, Plagiarism. Web of science, Scopus, Science citation index.	Course teacher and subject expert	
21PC Y2N2	* Non-Major Elective-II Chemistry in mankind	Unit I Unit II Unit III	100%		Unit I Paints Paints, varnish and lacquers- ingredients, characteristics and their uses. Chemistry in Colouring Matter - Classification of Dyes on the Basis of Constitution. Unit II Cleansing agents Cleansing agents - Soaps - classification, manufacture, dry cleaning-properties.	Course Teacher	

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						Unit III Milk and Milk products: Milk and Milk products- composition of Milk; Flavour and aroma of Milk; Physical properties of Milk; milk products; Cream; butter; ice Cream; milk powder.	
21PC Y207	Inorganic Chemistry Practical -I	Part C	20%	NIL		Titrimetry Complexometric titrations using EDTA - Estimations of Magnesium, Nickel & Zinc.	Course Teacher
21PC Y208	Organic Chemistry Practical -I	Part C	10	NIL		General methods of separation and purification of organic compounds such as: 1. Solvent extraction 2. Soxhlet extraction 3. Fractional crystallization 4. TLC and Column Chromatography 5. Melting point of synthesized compounds.	Course Teacher
		Part D	5	NIL		Identification of structural pattern of organic compounds (Flavone, Isoflavone and Quinone) by taking UV spectrum (class work only).	Course Teacher
21PC Y209	Physical Chemistry Practical -I	--	--	--	--	--	--
21PC Y310	Organic Chemistry - III- Natural Products and Organic Reagents	Unit-I	2	NIL		Biosynthesis of mono and di terpenoids.	Course Teacher
		Unit-II	2	NIL		Estrogen and structural elucidation of equilenin (synthesis not expected).	Course Teacher
		Unit-III	20	N-			Subject

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				<p>terminal(Hydrazinolysis, reduction and carboxypeptidase methods only) and C-terminalresidueanalysis (phenylthiohydantoin, cyanate and DNP methodonly) Synthesis of polypeptides (Sheehan's, Halpen's and Fischer's methods only), - structure of DNA andRNAand theirbiologicalimportance. Primary, secondary and tertiary structures of proteins Enzymes andbiosynthesisofproteins, application ofcatechin,kaempferol andquercetin. Structure,synthesisandreactionsofflavones,isoflavone s,purines(adenine andguanine)and anthocyanins(cyaninandpe largonin) thymine. Structural elucidation of caffeine. Self-study: Uracil and Cytosine.</p> <p>NIL</p> <p>NIL</p>	<p>An introduction to retrosynthesis - synthon - synthetic equivalent - target molecule, functional group interconversion. Retro synthetic analysis and Synthesis of simple organic molecules such as 1,2, 1,3, 1,4 and 1,5 - dicarbonyl compounds both acyclic and cyclic. Formation of 3, 4, 5 and 6 membered cyclic compounds. Use of standard reactions, like Grignard reactions, Robinson annulations etc., Protection and deprotection of functional groups - R-OH, RCHO, R-CO-R, R-NH₂ and R- COOH. Self-study: Grignard reactions, Robinson annulations.</p>	Expert
		Unit-IV Unit-V	NIL 10			Course Teacher

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Y312

						<p>NIL</p> <p>Woodward and Prevost hydroxylation - tri-n-butyltin hydride .Structure, synthesis and reactions of flavones, isoflavones, purines (adenine and guanine) and anthocyanins (cyanin and pelargonin) thymine, uracil, cytosine. Structural elucidation of caffeine.</p>
21PC Y311	Physical Chemistry – III – Classical and Statistical Thermodynamics	Unit - V	20%	<p>Catalysis Catalysis- acid-base catalysis - enzyme catalysis - Michaelis-Menten equation - effect of temperature on enzyme catalysis - heterogenous catalysis - kinetics of heterogeneous catalysis - Langmuir- Hinshelwood, Rideal - Eley mechanism - pH dependence of rate constants of catalyzed reactions - auto catalysis and oscillatory reactions. Surface phenomenon - physisorption and chemisorptions - applications - factors influencing adsorption - adsorption isotherms: Langmuir, Freundlich, BET and Gibbs adsorption isotherm - measurement of surface area.</p>	<p>Quantum Statistics Bose Einstein distribution law- derivation – entropy of boson applications. Derivation of Planck’s black body radiation law. Bose Einstein condensation. Helium at low temperature Fermi – Dirac distribution law- derivation, entropy of fermions, Applications - electron gas, fermi energy of free electrons at absolute zero. Heat capacity of free electrons in metals, comparison of Maxwell Boltzmann, Bose Einstein, Fermi - Dirac statistics.</p>	Course teacher
21PC	Spectroscopi	Unit -III	1%	Nil	LC-MS and GC-MS	Course

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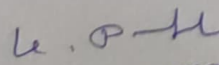
Y312	c Techniques – Application in Organic Chemistry					teacher
21PC Y3EA	Major Elective –II * Applied Electrochemi stry	Unit II	20%	Unit II Cells Electrochemical cells - Types of cells - divided and undivided cells - chlor-alkali cells mercury, diaphragm and membrane cells - electro- inorganic chemicals - chlorates, perchlorates - electrosynthesis of fluorine - electro-organic chemicals - electro- reduction of nitro and carbonyl groups - Kolbe synthesis-electro dimerisation - adiponitrile.	Unit II Electrochemical Cells: Electromotive force - measurement of EMF - the potentiometer - the electrochemical potential - the cell EMF and the cell reaction - reversible cells - types of half cells - classification of cells - the standard EMF of a cell – standard electrode potentials - calculation of the EMF of a cell - Nernst equation and its limitations - calculation of solubility products - standard free energies and entropies of aqueous ions - electrode concentration cells - electrolyte concentration cells - cells with liquid junctions - oxidation - reduction reactions	
21PC Y3EB	* Nanoscience and				New course	Course teacher
21PC Y3EC	Nanotechnol ogy *Dye chemistry					
21PC Y3AL	Advanced functional materials /				New course	Course teacher

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		MOOC					
21PC Y3N3	Non Major Elective-III Chemistry In Context	Unit III	20%	Unit V Plastics and polymers The world of plastics and polymers -3R principle- Reduce, Reuse and Recycle- polymers - polyethylene - plastics and recreation - paper or plastics.			Course teacher
21PC Y413	Inorganic Chemistry – III- Bioinorganic and Inorganic Photochemis- try	Unit - II	20%	Chemistry of Inner transition elements 13 Hrs Color and complex formation inner transition elements- comparison between 'd' and 'f' block elements - magnetic properties of Lanthanides and Actinides - complex formation and color absorption spectra of lanthanides and actinides. Comparison between lanthanides and actinides.	Bioinorganic chemistry:II Metals in medicine Binding of metal ions and complexes to biomolecules, Types of binding - Nucleic acid structures - Fundamental interactions with nucleic acids - Binding interactions of tris- phenanthroline metal complexes with DNA - Techniques to monitor binding (Electronic absorption, Fluorescence and Circular dichroic spectral techniques, electrochemical behaviour, viscosity measurement and polarimetry). Chemotherapy - Radio diagnostic agents - MRI scanning - Chelating Agents (with special reference to EDTA) and therapy based on in vivo chelation of radio nucleotides - Dosage and toxicity. Au in rheumatic arthritis – Pt, Au and metallocenes in anticancer drugs (Cis- platin).		Subject Expert
21PC	Analytical	Unit I	10%	Unit I	Unit IV		Subject


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Y414	Techniques	Unit IV	10%	Analysis of variance (ANOVA)- Correlation and Regression - curve fitting , fitting of linear equations, simple linear cases, weighted linear case, analysis of residuals - general polynomial equation fitting , linearizing transformations, exponential function fit - r and its abuse - multiple linear regression analysis, elementary aspects.	NQR spectroscopy Theory and Principle of NQR spectroscopy- Nature of electric field gradient, Energy levels and selection rules, Interaction of electric quadrupole with electromagnetic radiation, nuclear orientations, the asymmetry parameter, quadrupole transitions in spherical, axially symmetric fields and not axially symmetric fields. Applications of NQR spectra.	Expert
21PC Y4EA 21PC Y4EB 21PC Y4EC	Major Elective –III * Medicinal Chemistry * Computational chemistry * Green Chemistry	All units	100%	New course	New course	Course teacher
21PC Y415	Inorganic Chemistry Practical –II	Part A	20%	Titrimetry: Complexometric titration involving EDTA. 1. Calcium 2. Magnesium 3. Nickel 4. Zinc	Cerimetry 1. Estimation of ferrous iron in ferrous ammonium sulphate 2. Estimation of oxalic acid 3. Estimation of nitrite	Course teacher/ Industrial expert
21PC Y416	Organic Chemistry Practical –II	--	--	--	--	--
21PC Y417	Physical Chemistry Practical –II	Part-A	20%	--	Determination of hydrolysis constant of aniline hydrochloride Determination of metal to ligand ratio of complexes by Job's method using UV-visible Spectrophotometer Determination of	--

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						Butler-Volmer relation and its approximations - symmetry factor and transfer coefficient - Tafel equation -charge transfer resistance - Nernst equation from Butler-Volmer equation -primary and secondary batteries -fuel cells - corrosion and its prevention methods Self-study: Corrosion control	
21PC Y2EA 21PC Y2EB 21PC Y2EC	Major Elective –I * Green, Nanochemistry & Cyber Security * Food Science and Technology * Advanced Polymeric Materials	Unit-III	20%	Journals, patents, journals of different fields of chemistry (organic, inorganic, physical, polymer, analytical and nano) - secondary sources- books, indexes, chemical abstracts, review articles - literature searching online. E-journal	Concepts of Research - Importance of research in science, Criteria of good research, Sources of a research problem. Types of research - Basic, applied, action, experimental, diagnostic and exploratory. Primary and secondary sources -N-list-journals, plagiarism, Intellectual property rights, patent, trade, Copyrights, Plagiarism. Web of science, Scopus, Science citation index.	Course teacher and subject expert	
21PC Y2N2	* Non-Major Elective-II Chemistry in mankind	Unit I Unit II Unit III	100%		Unit I Paints Paints, varnish and lacquers- ingredients, characteristics and their uses. Chemistry in Colouring Matter - Classification of Dyes on the Basis of Constitution. Unit II Cleansing agents Cleansing agents - Soaps - classification, manufacture, dry cleaning-properties.	Course Teacher	

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