



Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu & Accredited by NAAC with 'A++' Grade (3rd Cycle-3 64 CGPA)
Dr. N.G.P.-Kalapatti Road, Coimbatore-641 048, Tamil Nadu, India.
Website: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

BoS

13th

MINUTES OF THE THIRTEENTH BOARD OF STUDIES MEETING

Board: Chemistry

Faculty: Basic and Applied Sciences

The Meeting of Board of Studies (BoS) was held as given below:

Name of the Body	BoS
Department	Chemistry
Meeting No.	13
Date and Time	08.06.2023 @ 10.00 a.m.
Venue	Room No: IQAC Board Room
Members Attended	The details are given in the ANNEXURE -I

AGENDA

1.	Discussion on UG syllabi for Part III - Core Course in Third semester for 2022-23 Batch and onwards
2.	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Mathematics in Third semester for 2022-23 Batch and onwards
3.	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered to Department of Physics in Third semester for 2022-23 Batch and onwards
4.	Discussion on Part I (Tamil/Hindi /French/Malayalam) offered by Language departments for 2022-23 Batch and onwards
5.	Discussion on Part II offered by English department for 2022-23 Batch and onwards
6.	Discussion on UG syllabi for Part III - Core Course in First semester, IDC offered by Department of Physics and IDC offered to Department of Biochemistry, Biotechnology, Food Science and Nutrition, for 2023-24 Batch and onwards
7.	Discussion on Part I (Tamil/Hindi /French/Malayalam) offered by Language departments for 2023-24 Batch and onwards
8.	Discussion on Part II offered by English department for 2023-24 Batch and onwards
9.	Discussion on Part IV (AECC) Environmental studies for 2023-24 Batch offered by Department of Microbiology
10.	Discussion on credit for Part V Extension Activity for 2023-24 Batch and onwards
11.	Discussion on PG syllabi in Third semester courses for 2022-23 Batch and onwards
12.	Discussion on PG DSE syllabi in Third semester courses for 2022-23 Batch and onwards



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Discussion on PG Core and DSE syllabi in First semester courses for 2023-24 Batch	
13.	Discussion on PG Core and DSE syllabi in First semester courses for 2023-24 Batch and onwards
14.	Discussion on Value Added Certificate Course (VACC)
15.	Discussion on Practical to be included in the curriculum as per the requirement of DBT Star scheme sponsored instruments
16.	Any other matter



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MINUTES OF THE THIRTEENTH BOARD OF STUDIES MEETING

Board: Chemistry

Faculty: Basic and Applied Sciences

The Chairman of BoS welcomes all the panel members for the meeting. The items listed in the agenda were taken for discussion.

The following are the minutes of the meeting:

Item - 01	Discussion on UG syllabi for Part III - Core Course in Third semester for 2022-23 Batch and onwards
Discussion	222CE1A3CA – APPLIED CHEMISTRY (New course) Dr. R.Prabhakaran suggested to add the topics Unit II- Bio fertilizer Unit IV- CNG as a fuel and Unit V- Waterproof chemicals (hydrophobic and hydrophilic). 222CE1A3CB - BASIC CONCEPTS IN ANALYTICAL METHODS (New course) Dr. Subhashini K. Sripathi recommended to delete the following topics in Unit I – Errors, Accuracy, precision, significant figures. Types of titration permanganometry. Dr. Subhashini K. Sripathi recommended to add the following topics in Unit I- titrimetric methods and permanganometry to enrich the knowledge of the students.
Resolution	The Board unanimously approved the syllabi
Item - 02	Discussion on UG syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Mathematics in Third semester for 2022-23 Batch and onwards
Discussion	222MT1A3IP- Mathematics with MAT lab (IDC) The syllabus approved by the Board of Studies in Mathematics was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item - 03	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered to Department of Physics in Third semester for 2022-23 Batch and onwards
Discussion	222CE1A3IP- Allied Chemistry -I (New Course)
Resolution	The Board unanimously approved the syllabus

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Item - 04	Discussion on Part I (Tamil- /Hindi- /French- /Malayalam) offered by Language departments for 2022-23 Batch and onwards
Discussion	221TL1A3TA: Part I: Tamil-III (New course) 221TL1A3HA: Part I: Hindi-III (New course) 221TL1A3FA: Part I: French-III (New course) 221TL1A3MA: Part I: Malayalam – III (New course) The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.
Resolution	The Board unanimously approved the syllabi.
Item - 05	Discussion on Part II offered by English department for 2022-23 Batch and onwards
Discussion	221EL1A3EA : Part II: Professional English III (New Course) The unified syllabus approved by the Board of Studies in English was placed for endorsement.
Resolution	The Board unanimously approved the syllabus.
Item - 06	Discussion on UG syllabi for Part III - Core Course in First semester, IDC offered by Department of Physics and IDC offered to Department of Biochemistry, Biotechnology and Food Science and Nutrition for 2023-24 Batch and onwards
Discussion	232CE1A1CA: Core I: General Chemistry I 232PY1A1IP: IDC: Allied Physics - I 232CE1A1IA: IDC: Allied Chemistry (Biochemistry and FS&N) 232CE1A1IB: IDC: Allied Chemistry (Biotechnology)
Resolution	The Board unanimously approved the syllabi.
Item - 07	Discussion on Part I (Tamil- /Hindi- /French- /Malayalam) offered by Language departments for 2023-24 Batch and onwards
Discussion	231TL1A3TA: Part I: Tamil-I 231TL1A3HA: Part I: Hindi-I 231TL1A3FA: Part I: French-I 231TL1A3MA: Part I: Malayalam – I The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.
Resolution	The Board unanimously approved the syllabi.

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Item - 08	Discussion on Part II offered by English department for 2023-24 Batch and onwards
Discussion	231EL1A3EA: Part II: ENGLISH- I The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.
Resolution	The Board unanimously approved the syllabi.
Item - 09	Discussion on Part IV (AECC) Environmental studies for 2023-24 Batch offered by Department of Microbiology
Discussion	233MB1A1AA- Environmental studies The unified syllabus approved by the Board of Studies in Microbiology was placed for endorsement
Resolution	The Board unanimously approved the syllabus
Item - 10	Discussion on credit for Part V Extension Activity for 2023-24 Batch and onwards
Discussion	One credit to be awarded for each Extension activity like YRC/NCC/NSS/ RRC/Yoga/Sports/Clubs
Resolution	The Board unanimously approved one credit for Extension activity
Item - 11	Discussion on PG syllabi in third semester courses for 2022-23 Batch and onwards
Discussion	The content of the course of III semester of M.Sc. Chemistry 2022-23 Batch and onwards were discussed in the board. 222CE2A3CA - CHEMISTRY OF NATURAL PRODUCTS Dr. Shubashini K. Sripathi and Dr. R. Prabhakaran suggested to add to the topics in Unit V-Natural oxygenated heterocyclics and Nitrogen heterocycles for concise explanation and understanding of the course. 222CE2A3CB - ADVANCED INORGANIC CHEMISTRY Dr.R.Prabhakaran recommends to interchange the Units for sequential order. Include the topic bevatron in unit IV for concise explanation and understanding of the course. 222CE2A3CC - QUANTUM CHEMISTRY AND GROUP THEORY

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Dr. R. Prabhakaran and Dr. Shubashini K. Sripathi insisted to add the following topics in

Unit III-Maxwell-Boltzman, - Bose-Einstein- Fermi-Dirac-Born Oppenheimer approximation-Stirling's approximation for concise explanation and sequential learning of the course.

222CE2A3CD - ANALYTICAL SPECTROSCOPY

Dr.R. Prabhakaran and Dr. Shubashini K. Sripathi suggested to interchange the

Units for sequential order.

Include the topics in unit II-Spin-spin coupling- Nuclear Overhauser effect- Nuclear Quadrupolar resonance for concise explanation and sequential learning of the course.

Resolution

The Board members approved the syllabi.

Item - 12

Discussion on PG DSE syllabi in third semester courses for 2022-23 Batch and onwards

Discussion

The content of the course of III semester of M.Sc. Chemistry 2022-23 Batch and onwards were discussed in the board.

222CE2A3DA - DYE AND TEXTILE CHEMISTRY (NEW COURSE)

Dr.R.Prabhakaran and Dr. Shubashini K. Sripathi suggested to change title and add the following topics in

Unit II- Dyestuff Intermediates- Alcohols-Aliphatic and aromatic carboxylic acids and esters- Acid chlorides- Aldehydes and ketones-Aliphatic amines- Disperse dyes

Unit III-Process of singeing-Plate- Roller- Gas flame. Scouring- Process of scouring-Lime-Soda-Enzyme scouring-Bleaching agents-Oxidising-Reducing.

Unit V-Aim of ISO standard in quality control-ISO 9000:2000 and ISO 9001:2000-Fastness properties

222CE2A3DB - NANO SCIENCE AND NANO TECHNOLOGY(NEW COURSE)

Dr.R.Prabhakaran and Dr. Shubashini K. Sripathi suggested to change the title of the course. Include the topics in unit II-Graphene, Graphene Oxide, Reduced Graphene Oxide (RGO) for concise explanation and sequential learning of the course.

222CE2A3DC - BIO-ORGANIC CHEMISTRY (NEW COURSE)

Dr.R.Prabhakaran and Dr. Shubashini K. Sripathi suggested to add the topics in Unit IV-Laws of thermodynamics, Conservation of energy, transformation of energy, Free energy - Exergonic and endergonic reactions for concise explanation and sequential learning of the course.

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Unit V - Biosynthesis of fatty acid - Palmitic acid - Carbon source for fatty acid synthesis
- Formation malonyl- CoA - Reaction of fatty acid synthetase system - Acyl carrier protein
- Priming reaction - Malonyl transfer step - Biosynthesis of cholesterol - Biosynthesis of steroid hormones - Aldosterone

Resolution

The Board unanimously approved the syllabi

Item - 13

Discussion on PG core and DSE syllabi in First semester courses for 2023-24
Batch and onwards

Discussion

232CE2A1CA- Core-I Organic reaction Mechanism
232CE2A1CB- Core - II Coordination Chemistry
232CE2A1CC- Core - III Thermodynamics and Kinetics
232CE2A1CD- Core - IV Analytical Chemistry
232CE2A1DA- DSE-I - Polymer Chemistry
232CE2A1DB- DSE-I - Industrial Chemistry
232CE2A1DC- DSE-I - Green Chemistry

Resolution

The Board unanimously approved the syllabi.

Item - 14

Discussion

Discussion on Value Added Certificate Courses (VACC)
2CE5A- Industrial Products- A industry linked course
2CE5B- water and waste water treatment

The VACC course entitled Industrial products, water and waste water treatment offered to the BAS and Biosciences students were discussed

Resolution

The Board members approved the syllabus

Item - 15

Discussion

Discussion on Practical to be included in the curriculum as per the requirement of DBT star scheme sponsored instruments
Practical relevant to the instrument sponsored by DBT star scheme is included.
The Title of the practical included in
Semester III (R4) Inorganic analysis course

- Analysis of water quality parameters COD and BOD
 - Analysis of water quality parameters P^H , Turbidity and Dissolved solids
- Semester I (R5) Volumetric Analysis and Preparation
- Separation of dyes using Paper Chromatography
 - Separation of dyes using Thin layer Chromatography

Resolution

The Board members approved the syllabus

Item - 16

Any other matter

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The Chairman of Board of Studies (BoS) thanks all the members for their active participation and providing their valuable suggestions.

Date: 08.06.2023

(Dr. M. Suganthi)

BoS Chairman/HoD
Department of Chemistry
Dr. N. G. P. Arts and Science College
Coimbatore – 641 040



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B.Sc- SYLLABUS REVISION

Board: Chemistry

Course Code/Name: 222CE1A3CA – APPLIED CHEMISTRY

Name of the faculty: BAS
Semester: III

Unit	Existing	Changes
I	Pesticides Insecticides: Definition – Classification – Organic and inorganic insecticides – Structure and mode of action– DDT, methoxychlor, BHC, Gammaxane, Malathion, Parathion– Benefits of pesticides– Adverse environmental effects of pesticides. Fungicides: Definition – Classification – Structure and mode of action – Bordeaux mixture, mercury compounds, baygon, dithiocarbamates	
II	Fertilizers Definition- Chemical fertilizers - Classification of chemical fertilizers– Manufacture of Urea, Superphosphate, Triple super phosphate and Potassium nitrate. Mixed fertilizer and Organic fertilizer (Manures, compost, sawdust). Advantages and disadvantages of fertilizers	Bio fertilizer
III	Oils, Fats and Waxes Oils and Fats-Difference between oils and fats, properties of oils and fats, types of oils – Fatty oil, essential oil and mineral oil, difference between drying, semi-drying and non-drying oils, hydrogenation of oils, oil analysis - Saponification value, iodine value. Waxes: Properties and Classification, common waxes-spermaceti, bayberry, bees, Chinese insect, candelilla, carnauba wax, montan, ozocerite, paraffin, and synthetic wax- Properties and uses	
IV	Fuels Petroleum: Petroleum, cracking, synthetic petrol, refining of gasoline, reforming and knocking. Octane Rating of fuels, cetane rating, diesel engine fuel, kerosene as a fuel, LPG as a fuel. Fuels & Combustion: Classification, calorific value, Dulong's formula, analysis of coal, proximate and ultimate analysis, significance, carbonization of coal, manufacture of metallurgical	CNG as a fuel.

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coke by Otto-Hoffmann's Process. Flue gas
Analysis by ORSAT method

V

Construction materials
Introduction – Composition of white cement and
waterproof cement. Portland cement – Types –
cementing materials – Raw materials –
Manufacture – reactions in kiln – Mixing of
additives – Setting of cement – Properties of
cement – Testing of cement. Rotary kiln for wet
and dry processes – Gypsum – Plaster of Paris –
Setting and hardening of lime

Waterproof chemicals
(hydrophobic and hydrophilic).

Percentage of Syllabus revised: 10%

Course Focuses on:

- | | |
|--|--|
| ☒ Skill Development | ☒ Entrepreneurial Development |
| ☒ Employability | ☒ Innovations |
| ☒ Intellectual Property Rights | ☐ Gender Sensitization |
| ☐ Social Awareness/ Environment | ☐ Constitutional Rights/ Human Values/ Ethics |

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BOS

13th

Name of the faculty: BAS

Board: Chemistry

Course Code/Name: 222CE1A3CB - BASIC CONCEPTS IN

Semester: III
ANALYTICAL METHODS

Unit	Existing	Changes
I	Laboratory Practices Storage and handling of corrosive, toxic and poisonous chemicals-simple first aid procedure for acid and alkali in eye, acid and alkali burns, heat burns and cut by glasses. Errors, Accuracy, precision, significant figures. Principle of types of titration - acidimetry - alkalimetry - permanganometry - dichrometry - Iodometry - argentometry - Complexometric titrations.	titrimetric methods and permanganometry
II	Qualitative analysis Introduction - Dry reactions - heating, flame tests; Wet reactions - test tubes, centrifuge tubes, stirring rods, droppers, reagent bottles, centrifugation, transferring of precipitates, washing the precipitates - through Buchner funnel and sintered crucible, wash bottles, , heating of solutions, evaporation, dissolving of precipitates, precipitation with hydrogen sulphide, cleaning of apparatus. Interfering anions and its elimination - Classification of cations into analytical groups (group separation only).	Buchner
III	Quantitative Analysis The mole concept - atomic, molecular and molar masses. Equivalent mass- Equivalent mass of an acid, base, oxidizing and reducing agents. Concentration terms - Normality, molarity, mole fraction, molality, and percentage solution - weight composition, volume composition. Principles of volumetric analysis - standard solution (primary and secondary standards), titration - types (acid, base, oxidation, reduction), equivalent point, end point, choice of indicators - internal and external indicators, Theory of indicators - precautions to avoid errors in titrimetric analysis.	

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IV

Gravimetric Analysis

Precipitation methods, super saturation and precipitate formation, – post precipitation, co-precipitation, conditions of precipitation, precipitation from homogeneous solution, Ignition of the precipitate, quantitative separations based on precipitation methods - fractional precipitation. Organic precipitants - types- advantages and disadvantages, sequestering agents, solubility products and precipitation.

V

Crystal Growth

Introduction to crystal growth - nucleation – Gibbs - Thomson equation - kinetic theory of nucleation – limitations of classical nucleation theory - homogeneous and heterogeneous nucleation – different shapes of nuclei – spherical, cap, cylindrical and orthorhombic – Temkins model – physical modeling of BCF theory, Crystal Growth Techniques - Bridgman technique - Czochralski method - Verneuil technique - zone melting – gel growth – solution growth methods.

Percentage of Syllabus revised: 30%

Course Focuses on:

☒ Skill Development

☒ Employability

☒ Intellectual Property Rights

☐ Social Awareness/ Environment



Entrepreneurial Development



Innovations



Gender Sensitization



Constitutional Rights/ Human Values/ Ethics



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B.Sc
SYLLABUS (NEW COURSE)
Board: Chemistry
Course Code/Name: 222CE1A3IP- ALLIED

Name of the faculty: BAS
Semester: III
CHEMISTRY - I

Unit	Content
I	Solutions Normality, molarity, molality, mole fraction, mole concept. Primary and secondary standards – preparation of standard solutions. Principle of Volumetric analysis (with simple problems). Indicators – Theory of indicators. Estimation of Sodium hydroxide using HCl Estimation of Ferrous sulphate
II	Polymer Chemistry Introduction – Mechanism of polymerisation- types of polymerization – Addition, condensation and copolymerization - plastics-compounding of plastics. Preparation, properties and uses of cellulose nitrate, cellulose acetate, PVC, PVA, Nylon -66, PET, PAN. Conducting polymers. Determination of molecular weight of polymer by using viscometer Preparation of polystyrene
III	Basic Organic Chemistry Structure, Nomenclature, preparation and properties of Carboxylic acids, phenols, amides, amines and Carbohydrates Identification of simple organic Compounds
IV	Adsorption Adsorption- physisorption and chemisorption - factors influencing adsorption of gases on solids - Langmuir adsorption isotherm Verification of Freundlich Adsorption isotherm
V	Solubility Product and Acids and Bases Solubility and ionic equilibria, solubility product, applications of solubility product. Acids – bases, Arrhenius, Bronsted- Lowry and Lewis concepts and relative strength of acids and bases, pH scale. Determination of solubility product constant of Silver acetate Determination of Equivalent conductance at infinite dilution

Percentage of Syllabus revised: 100 %

Course Focuses on:



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| ☒ Skill Development | ☒ Entrepreneurial Development |
| ☒ Employability | ☒ Innovations |
| ☒ Intellectual Property Rights | ☐ Gender Sensitization |
| ☐ Social Awareness/ Environment | ☐ Constitutional Rights/ Human Values/ Ethics |



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BOS

13th

M.Sc-SYLLABUS REVISION

Board: Chemistry

Course Code/Name: 222CE2A3CA - CHEMISTRY OF NATURAL

Name of the faculty: BAS
Semester: III
PRODUCTS

Unit	Existing	Changes
I	Terpenoids Isolation and classification of terpenoids — Structural elucidation and synthesis of zingiberene, eudesmol, juvenile hormone, abeitic acid and caryophyllene	
II	Steroids Introduction -Structural elucidation and synthesis of cholesterol, ergosterol, equilenin, estrone, testosterone and progesterone	
III	Alkaloids Introduction – Isolation of alkaloids, structural elucidation and synthesis of morphine, reserpine, quinine, atropine and glaucine	
IV	Proteins and Nucleic Acids Proteins – Classification and properties (denaturation, isoelectric point and electrophoresis), primary, secondary, tertiary and quaternary structure of proteins – Synthesis of peptides and polypeptides- N-terminal and C- terminal residue analysis Nucleic acids - Structure and synthesis of nucleosides and nucleotides - Genetic code-Structure of RNA and DNA and their biological importance	
V	Heterocyclic compounds Heterocyclic compounds - Structure, synthesis and reactions of natural oxygenated heterocyclics - Flavones, isoflavones - Purines (adenine and guanine) - Anthocyanins (cyanin and pelargonin) and Uric acid. Synthesis and reactivity of - following nitrogen heterocycles - Oxazoles - Imidazoles - Thiazoles - Isooxazoles - Aziridines -Oxiranes - Azetidines - Pyrazines - Pyridazines and 1,2,3 and 1,2,4-triazoles	natural oxygenated heterocyclics Nitrogen

Percentage of Syllabus revised: 5%
Course Focuses on:



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| ☒ Skill Development | ☒ Entrepreneurial Development |
| ☒ Employability | ☒ Innovations |
| ☒ Intellectual Property Rights | ☐ Gender Sensitization |
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BOS

13th

Name of the faculty: BAS
Semester: III
CHEMISTRY

Board: Chemistry

Course Code/Name: 222CE2A3CB - ADVANCED INORGANIC

Unit	Existing	Changes
I	Solid State Chemistry I Cells and description of crystal structure - Close packing of spheres - Packing efficiency - Hexagonal close packed (hcp) and cubic close packed structures (ccp) - Coordination number - Relative density of packing in simple cubic, ccp, hcp and bcc - Tetrahedral and octahedral holes - Limiting radius ratio rule. Radius ratio for trigonal, tetrahedral, octahedral and cubic sites	
II	Solid State Chemistry II Perovskite structure of spinels - Stoichiometric defects - Schottky and Frenkel defects - Non-stoichiometric defects - Metal excess and metal deficiency defects - Extended defects - Line and plane defects. Band theory - Semiconductors - Intrinsic and extrinsic type - Fermi level- Flow of current in semiconductors - Hopping mechanism - Band structure - p and n type semiconductors - p-n junction - Superconductivity - superconductor - Photovoltaic effect	
III	Nuclear Chemistry I Nucleus: Nuclear structure - Stability of nuclei - Packing fraction - Even - odd nature of nucleons - n/p ratio - Nuclear potential - Binding energy and exchange forces - Shell model and Liquid drop model. Decay of radio nuclei - Rate of decay - Determination of half-life period. Modes of decay- Alpha, beta, gamma and orbital electron capture - Nuclear isomerism- Internal conversions - Q value - Nuclear cross section - Threshold energy and excitation functions. Particle acceleration and counting techniques- Linear accelerator - Cyclotron and Synchrotron -Betatron	UNIT IV and bevatron.
IV	Nuclear Chemistry II Applications of isotope- Esterification - Friedal Craft's reaction - Structural determination of PCl_5 - Solubility of sparingly soluble substance - Isotope dilution analysis - Carbon dating - Thyroiditis - Assessing the volume of blood in a patient - Brain tumor location and bone fracture healing control of predatory insects	UNIT V
V	Lanthanides General characteristics of lanthanides-Electronic configuration- Oxidation state- Lanthanide contraction- Lanthanide contraction and its consequences -Term symbols for Lanthanide ions (Derivation not	UNIT III

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required)-Factors that mitigate against the formation of lanthanide complexes - Electronic spectra and magnetic properties of lanthanide complexes. Lanthanide complexes as shift reagents- Difference between 4f and 5f orbitals.

Percentage of Syllabus revised: 10%
Course Focuses on:

- | | |
|--|--|
| ☒ Skill Development | ☒ Entrepreneurial Development |
| ☒ Employability | ☒ Innovations |
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BOS

13th

Name of the faculty: BAS
Semester: III
AND GROUP THEORY

Board: Chemistry

Course Code/Name: 222CE2A3CC - QUANTUM CHEMISTRY

Unit	Existing	Changes
I	Quantum Chemistry I Failure of classical mechanics and the success of quantum theory in explaining black body radiation - Photoelectric effect and the H-atom spectrum - DeBroglie's matter waves - Heisenberg's uncertainty principle - Schrodinger equation - Born's interpretation of the wave function - Requirements of the acceptable wave function Algebra of operators - Sums and products of operators - Commutator - Linear operators - Eigen functions and Eigen values - Correspondence between physical quantities in classical mechanics and Operators in quantum mechanics - Hamiltonian operator - Quantisation of angular momentum and its spatial orientation - Average (expectation) values - Postulates of quantum mechanics	
II	Quantum Chemistry II Particle in a one dimensional box - Quantization of energy - Normalisation of wave function - Orthogonality of the particle in a one-dimensional box wave functions - Average position and average momentum of a particle in a one-dimensional box - Illustration of the uncertainty principle and correspondence principle with reference to the particle in a one-dimensional box - Particle in a three-dimensional box - Separation of variables - Degeneracy Schrodinger equation for simple harmonic oscillator of a diatomic molecule - Illustration of the uncertainty principle and correspondence principle with reference to harmonic oscillator. Schrodinger equation for a rigid rotor of a diatomic molecule. Schrodinger equation for the H-atom (or H - like species) - Separation of variables - Energy levels - Radial factors of the H-atom wave functions	
III	Quantum Chemistry - III Need for approximation methods - The perturbation theory (first order only) application of the perturbation method to He- atom - The variation method - Applications of variation method to He-atom. Electron spin and the Pauli's principles - Symmetric and anti-symmetric nature of the wave functions - Slater determinants - Approximate wave function of many electron atoms - Born Oppenheimer approximation - Elementary concepts of MO and VB-theories - Hybridization - Huckel theory of linear conjugated systems - Cyclic systems - Woodward-Hoffman rules	Maxwell-Boltzman, Bose-Einstein, Fermi-Dirac-Born Oppenheimer

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		approximation-Stirling's approximation
IV	Group Theory I Symmetry elements and symmetry operations. Inverse operations. Definition of a group-Properties of a group, definition of abelian group, cyclic group, finite group, sub-group and isomorphic group - Group multiplication tables. Symmetry classification of molecules into point groups (Schoenflies symbols only). Matrices- Definition of matrix, diagonal matrix, null matrix, unit matrix, row matrix, column matrix , symmetric matrix, Skew matrix and conjugate matrix. Matrix multiplication. Determination of inverse matrix. Block multiplication of matrices. Matrix notations of symmetry operations of C_{2v} and C_{3v} point groups	
V	Group Theory II Definition of reducible and irreducible representations – Irreducible representations orthogonal vectors – Direct product rule – The Great Orthogonality Theorem and its consequences (statement only, proof not needed) - Construction of character table of C_{2v} and C_{3v} point groups - Calculation of binary co-ordinates in the character tables for C_{2v} and C_{3v} point groups – Calculation of character values of reducible representations per un shifted atom for each type of symmetry operation – Determination of total Cartesian representation– Determination of direct sum from total Cartesian representation. Type of hybridization of atomic orbitals in acetylene, CH_4 and $[PtCl_4]^{2-}$ Group theory and Vibrational spectroscopy – Vibrational modes as basis for group representation–Symmetry selection rules for IR and Raman spectra (Mutual Exclusion Principle–Classification of vibrational modes)	

Percentage of Syllabus revised: 20%

Course Focuses on:

- | | |
|--|--|
| ☒ Skill Development | ☒ Entrepreneurial Development |
| ☒ Employability | ☒ Innovations |
| ☒ Intellectual Property Rights | ☐ Gender Sensitization |
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Bos

13th

Name of the faculty: BAS
Semester: III

Board: Chemistry

Course Code/Name: 222CE2A3CD - Analytical Spectroscopy

Unit	Existing	Changes
I	NMR Spectroscopy NMR active nuclei- Equivalent and non-equivalent protons and number of signals. Application NMR spectroscopy in the structural analysis of organic compounds - Uses of parameters like Chemical shifts (both proton and carbon) and coupling constant -J- resolved, H,H-COSY, C,H-COSY, and NOESY spectra. Application of NMR in the structural elucidation of inorganic compounds - ³¹ P NMR spectra of P ₄ S ₃ , H ₃ PO ₃ , and HPF ₂ ; ¹⁹ F NMR spectra of ClF ₃ , BrF ₅ and equimolar mixture of TiF ₆ and TiF ₄ in ethanol	Unit-II Spin-spin coupling, Nuclear Overhauser effect-Nuclear Quadrupolar resonance,
II	Mass Spectroscopy Mass Spectrometry - Instrumentation - Resolution - ESI, EI, CI, MALDI and FAB method, presentation of spectral data, molecular ions, meta stable ions, molecular ion peak, Nitrogen rule, isotopic abundance analysis. Fragmentation process, even and odd electron ions, scission with rearrangement. Retro Diels Alder rearrangement, Mc Lafferty rearrangement. Fragmentation associated with functional groups - aliphatic compounds, aldehydes, ketones, carboxylic acids, esters, amides, alcohols, thiols, amines, ethers, sulphides and halides, aromatic compounds, elimination due to ortho groups	Unit-IV
III	IR and Raman Spectroscopy Application of IR in Organic chemistry- characteristic group frequencies - Finger print region. Combined application of IR and Raman spectra for structural elucidation of N ₂ O, ClF ₃ , ClO ₄ - and NO ₃ -; Sampling techniques- group theoretical approach to find the IR and Raman active vibrations of simple compounds - Effect of coordination upon ligand vibrations of H ₂ O, CNS-, NO ₃ -, CN-& SO ₂	Unit-I

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IV	¹³C NMR Spectroscopy Difficulties and solution for recording ¹³ C- NMR spectra- ¹³ C NMR spectra scale- solvent- Signals and their positions, multiplicity, ¹³ C 1H coupling constant- proton coupled and decoupled ¹³ C spectra- broad bands decoupling- off resonance technique. Chemical shifts in ¹³ C spectra- calculation in internal and terminal- substituted compounds and aromatic compounds. Use of ¹³ C spectra in differentiating in primary, secondary and tertiary carbons by DEPT. Theory and Principles of 2D NMR Spectroscopy, Interpretation of 1H -1H COSY, 1H - ¹³ C HETCOR, HMQC, HMBC	Unit-III
V	Problems in Spectroscopy Woodward-Fieser rules for calculating absorption maximum in conjugated dienes, polyenes, α , β - unsaturated carbonyl compounds, benzenoid systems. Conjoint spectroscopic problems: Structure determination of organic compounds by using UV-Vis, IR, 1H & ¹³ C-NMR and Mass spectroscopic techniques (simple molecules only – restricted to 12 carbon systems with/ without one hetero system)	

Percentage of Syllabus revised: 10%

Course Focuses on:

☒ Skill Development	☒ Entrepreneurial Development
☒ Employability	☒ Innovations
☒ Intellectual Property Rights	☐ Gender Sensitization
☐ Social Awareness/ Environment	☐ Constitutional Rights/ Human Values/ Ethics



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BOS

13th

Name of the faculty: BAS
Semester: III
CHEMISTRY

Board: Chemistry

Course Code/Name: 222CE2A3DA - DYE AND TEXTILE

Unit	Existing	Changes
I	Types of Dyes Quinonoid dyes-examples and structure-Anthroquinone and Mordant dyes synthesis and applications of Alizarin-Phthalocyanin dyes-Copper Phthalocyanin- Synthesis and applications. Diphenylmethane dyes- Auramine-Triphenylmethane dyes-Malachite green, Crystal violet and applications. Phthalein dyes-Phenolphthalein- preparation and applications	
II	Dyes and Intermediates Synthesis of important dye intermediates. Commercial processes for Azo dyes, reactive dyes, optical brighteners, thermal sensitive dyes, dispenses dyes	
III	Dyeing Process Impurities present in grey cotton and cotton fabrics. Objects of singeing – process of singeing. Objects of Desizing –Acid and Enzyme desizing Object of Scouring - Process of caustic scouring on Kier machine. Bleaching chlorine and peroxide bleaches, Blueing agents and optical brightening agents.	
IV	Printing Comparison between dyeing and printing – styles and methods of printing, Ingredients in printing paste. Batik style on cotton with reactive dyes. Screen and Rotary screen design preparation –Table screen printing , Flat bed screen printing machine, Rotary screen printing machine Study of curing machine and Steamer	
V	Quality control and Pollution Control Importance and need of Quality control- Determination of wash fastness (ISO) test 3 and 4-Wet and Dry Rubbing fastness- Light fastness. Importance and need of environment protection – Constituents of air, water and noise pollutants with respect textile industry – effluent treatment process—Importance of eco-friendly processing – List of banned dyes and chemicals, Eco labels.	Indian standard Organization, To, Aerobic- Anaerobic- Dissolved Oxygen, Biological Oxygen Demand and Chemical Oxygen Demand

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| ☒ Employability | ☒ Innovations |
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13th

Name of the faculty: BAS
Semester: III
TECHNOLOGY

Board: Chemistry

Course Code/Name: 222CE2A3DB – NANO SCIENCE AND NANO

Unit	Existing	Changes
I	Basics of NanoScience Nanoscience, nanomaterials -Scale of materials natural and manmade- properties-Classification of Nanomaterials-origin, phase composition, constituents, dimensions -Energy at bulk and nano scale- Size effect of Nanomaterials- shape, density, melting point, specific surface area, band gap variation-Quantum confinement	
II	Carbon Nanostructures Introduction- carbon molecules -nature of the carbon bond -new carbon structures; carbon clusters - carbon nanotubes,-fabrication - structure -electrical properties -mechanical properties; applications of carbon nanotubes -field emission and shielding -computers -fuel cells -chemical sensors -catalysis -mechanical reinforcement.	Graphene, Graphene Oxide, Reduced Graphene Oxide (RGO)
III	Synthesis of Nanomaterials Chemical methods- Chemical precipitation and co-precipitation, Sol-gel synthesis, Solvothermal synthesis, Microwave heating synthesis, Sonochemical synthesis, Electrochemical synthesis and Photochemical synthesis. Physical Methods -Inert gas condensation, Ion sputtering, Laser ablation, Laser pyrolysis, Ball Milling , Chemical vapour deposition and Electro deposition.	
IV	Characterization Techniques Structural characterization-Electron microscopy techniques-Scanning electron microscopy, transmission electron microscopy- X-ray diffraction - FTIR - UV - Visible spectrophotometer . Surface characterization- XPS, atomic force microscopy. Characterization of porous structures.	
V	Applications of Nanomaterials Nanomaterials for Solar cells-smart materials- -biosensors-drug delivery and therapy- food packaging-detection of cancerous cells, Nano polymer composite in defence and aerospace. Nanoscale catalysts for energy and automobile industries - Nanomaterials for electrodes and wearable electronics-Nanobased coating and paints.	

Percentage of Syllabus revised: 20%

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| ☒ Skill Development | ☐ Entrepreneurial Development |
| ☒ Employability | ☐ Innovations |
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BOS

13th

Name of the faculty: BAS
Semester: III

Board: Chemistry

Course Code/Name: 222CE2A3DC - BIO-ORGANIC CHEMISTRY

Unit	Existing	Changes
I	Carbohydrates Classification of carbohydrates. Occurrence, structure, properties and uses -sucrose, lactose - starch- cellulose. Carbohydrate metabolism: glycolysis, gluconeogenesis, glycogen metabolism (overview only, structures not required). Diabetes mellitus (elementary details).	
II	Enzymes and Cofactors Chemical nature of enzymes – characteristics of enzymes – colloidal nature, catalytic nature. Mechanism of enzymes – Michaelis-Menten hypothesis – Fischer's lock and key model, induced fit model. Structure and biological functions of coenzyme A, NAD and FAD.	
III	Lipids Lipids – definition – simple lipids – fats and oils –compound lipids – phospholipids - phosphoglyceride - derived lipids - C24 steroids – physical properties – solubility, melting point, surface tension, emulsification and geometric isomerism – chemical properties – reaction involving -COOH group -OH group and double bonds	Low density lipids and high density lipids
IV	Bioenergetics- thermodynamic principles – first law, second law, combining the two laws – relationship between standard free energy change and equilibrium constant. Standard free energy values of chemical reactions – Adenosine triphosphate (ATP) hydrolysis and equilibria of coupled reactions – inter conversion of adenine nucleotides	thermodynamic principles – Conservation of energy, transformation of energy, Free energy - exergonic and endergonic reactions
V	Biosynthesis of lipids Nature and distribution of fat –biosynthesis of long-chain fatty acids, unsaturated fatty acids, phosphatidylethanol, –regulation of cholesterol-	Biosynthesis of fatty acid - Palmitic acid - Carbon source for fatty acid synthesis - Formation malonyl-CoA - Reaction of fatty acid synthetase system - Acyl

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biosynthesis

carrier protein - Priming reaction
- Malonyl transfer step -
Biosynthesis of cholesterol -
Biosynthesis of steroid hormones
- Aldosterone

Percentage of Syllabus revised: 20%
Course Focuses on:

- | | |
|--|--|
| ☒ Skill Development | ☒ Entrepreneurial Development |
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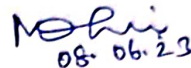
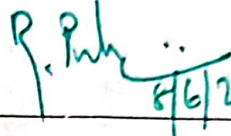
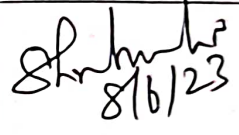
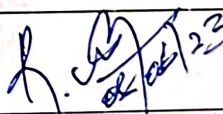
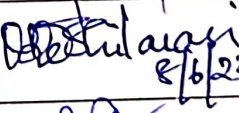
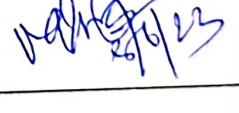
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ATTENDANCE OF THE THIRTEENTH BOARD OF STUDIES MEETING

Faculty: Basic and Applied Science

Board: Chemistry

S. No	Name	Designation	Signature
1.	Dr. M. SUGANTHI Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48	Chairman	 08.06.23
2.	Dr. R. PRABHAKARAN Assistant Professor, Department of Chemistry, Bharathiar University, Coimbatore-46	Vice Chancellor Nominee	 8/6/2023
3.	Prof. R. NANDHAKUMAR Professor of Applied Chemistry, School of Sciences Karunya Institute of Technology and Sciences, Coimbatore-114	Subject Expert	ABSENT
4.	Dr. SUBHASHINI K SRIPATHI, Professor of Chemistry, School of Physical Sciences and Computational Sciences, Avinashilingham University, Coimbatore-43	Subject Expert	 8/6/23
6.	MR. E. MUTHUSAMY Priyadarshini Chemicals Pvt.Ltd Nava India, Coimbatore-06.	Industry Expert	 8/6/2023
7.	Mr. S.Munishkumar Supervisor PSG Hospital Peelamedu Coimbatore – 641004.	Alumni	 08/06/23
8.	Dr. R. RAVIKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	 08/06/23
9.	Dr. M. R. EZHILARASI Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	 8/6/23
10.	Dr. M. DINESHKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	 8/6/23
11.	Mrs. P.KAVITHA Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	 8/6/23

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12.	Dr. R. MENAKA Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	
13.	Dr. M. MOHANRAJ Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	
14.	Dr. R. RAJKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	
15.	Dr. S. SHYAM SHIVAPPAN Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	
16.	Dr. P. AMARAVATHY Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	
17.	Dr. N. KUPPUCHAMY Professor & Head, Department of Tamil, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
18.	Dr. R. VITHYA PRABHA Professor & Head, Department of English, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
19.	Dr. K. GIRIJA Assistant Professor & Head, Department of Physics, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
20.	Dr. R. SOWRIRAJAN Assistant Professor & Head, Department of Maths, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
21.	Dr. S. GOWRI Professor and Head Department of Biochemistry Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
22.	Dr. P. CHIDAMBARA RAJAN Professor and Head Department of Biotechnology Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	

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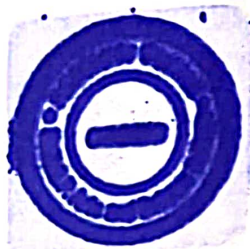
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BoS

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23.	Dr. D. SRIDEVI Professor & Head, Department of Food Science & Nutrition, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
24.	Dr. J. RENGAMANUJAM Professor & Head, Department of Microbiology, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	
25.	Ms. P. DHIVYABHARATHI III B.Sc. Chemistry, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Student Representative	P. Dhivyabharathi.
26.	MS. A.A. JAFEENA II M.Sc. Chemistry, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Student Representative	

Date: 08.06.2023



(Dr. M. SUGANTHI)

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