

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

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Accredited by NAAC A++ Grade (3rd Cycle- 3.64 CGPA)
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BoS

14th

Board of Studies Meeting

Department of Chemistry

The minutes of the 14th meeting of Board of Studies held on 17.10.2023 at 10.00 am at the IQAC Board Discussion Room.

Members Present:

S. No.	Name	Category
1	Dr. M. Suganthi	Chairman
2	Dr. R. Prabhakaran	University Nominee
3	Prof. R. Nandhakumar	Subject Expert
4	Dr. Shubhashini K Sripathi	Subject Expert
5	Mr. E. Muthusamy	Industrial Expert
6	Mr. S. Munishkumar	Alumni
7	Dr. R. Ravikumar	Member
8	Dr. M. Dineshkumar	Member
9	Mrs. P. Kavitha	Member
10	Dr. R. Menaka	Member
11	Dr. M. Mohanraj	Member
12	Dr. R. Rajkumar	Member
13	Dr. P. Amaravathy	Member
14	Dr. S. Shyam shivappan	Member
15	Dr. N. Kuppuchamy	Co-opted Member
16	Dr. R. Vithya prabha	Co-opted Member
17	Dr. K. Girija	Co-opted Member
18	Dr. R. Sowrirajan	Co-opted Member
19	Dr. D. Sridevi	Co-opted Member



20	Dr. J. Renga ramanujam	Co-opted Member
21	Ms. R. Aishwarya	Student Representative- UG
22	Mr. P. Perumal	Student Representative- PG

The HoD and Chairman of the department of chemistry welcomed and introduced all the members and appreciated them for their continuous support, contribution for the development of academic standard and enrichment of the syllabus.

Further, Chairman informed the inability of the following members to attend the meeting and requested to grant leave of absence.

1. Dr. M. R.E. Ezhilarasi – Member

The items of the agenda were taken one by one for discussion and the following resolutions were passed.

Item 14.1

To review and approve the minutes of the previous meeting held on **08.06.2023**.

The Chairman of the board presented the minutes of the previous meeting held on **08.06.2023** and requested the members to approve. After brief discussion the following resolution was passed

Resolution:

Resolved to approve the minutes of the previous meeting held on 08.06.2023.

Item 14.1 (a): To consider and approve the syllabi for II semester for the students admitted during the academic year 2023-24.

The Chairman presented the detailed scheme and syllabi for the II semester for the students admitted from the academic year 2023-24 onwards. The details of changes made also presented as follows.

Changes Made:

M.Sc. Chemistry		
Course	Code	Reason
Molecular Spectroscopy	232CE2A2CC	Unit III – Chemical shift and factors affecting chemical shifts, spin-spin splitting was added Unit V - Remove electronic from Zeeman effect



IDC Offered

Course	Code	Department
Chemistry in Textiles	232CE1A2IA	Costume Design and Fashion
Applied Chemistry	232CE1A2EP	Food Science and Nutrition
Basic Chemistry	232CE1A2EQ	Microbiology

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the syllabi for the II semester for the students admitted from the academic year 2023-24 onwards.

Item 14.1 (b): To consider and approve the changes, if any, in the syllabi for IV semester for the students admitted during the academic year 2022-23.

The Chairman presented the detailed syllabi for the IV semester for the students admitted from the academic year 2022-23 onwards. The details of changes made also presented as follows:

Changes Made:

B.Sc. Chemistry		
Course	Code	Reason
Spectroscopy and Chromatography	222CE1A4CB	Unit I – Added Electromagnetic radiation (EMR) before the principle of UV.
M.Sc. Chemistry		
Course	Code	Reason
Synthetic Organic Chemistry	222CE2A4CA	Unit IV - Included Suzuki coupling and excluded Julia synthesis Unit V - Included specific methods of resolution.
Statistical Thermodynamics and Computational Chemistry	222CE2A4CB	Macromolecules unit is excluded and Computational chemistry unit expanded to two units. Unit I - Gaussian distribution placed before Maxwell-Boltzmann distribution law. Unit V - Included Docking studies and



		chemdraw Added reference manuals for chemdraw and docking studies.
Environmental Chemistry	222CE2A4DA	Unit II - Included Minameta disease and Mercury pollution. Included general methods in monitoring methods. Unit III - Deleted Air pollutant accidents, TCDD, Bhopal Disaster and Chernobyl Disaster Unit IV - Some major nuclear accidents deleted. Change editions for all books. Case study included in all the units.
Catalysis	222CE2A4DB	Unit I – Title changed to Introduction to Catalysis. Catalytic poison and phase transfer catalysis were added. Unit II - Removed directed in ortho metalation. Ru and Os added before Rh and Ir. Mo and W added before the Rh. Unit III – AFM (Atomic Force Spectroscopy) and BET(Brunauer–Emmett–Teller) techniques were added and Auger spectroscopy to surface studies deleted. Unit IV – Surface area, pore size and acid strength measurements were deleted.

New Courses Introduced:

B.Sc. Chemistry		
Course	Code	Reason
Green Chemistry	222CE1A4SA	-



IDC:

Course	Code	Department
Chemistry -II	222CE1A4EP	Physics

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the syllabi for the IV semester for the students admitted from the academic year 2022-23 onwards.

Item 14.2: To approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2023-24.

The Chairman presented the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2023-24.

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2023-2024.

Item 14.3: To consider and approve any other item brought forward by the Chairman and the members of the board.

No other item was brought forward.

Finally, the Chairman thanked all the members for their cooperation and contribution in enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was closed with formal vote of thanks proposed by Dr. M. Suganthi, Head and Chairman- Chemistry BoS.



B.Sc- SYLLABUS REVISION

Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE1A4CB – SPECTROSCOPY AND

CHROMATOGRAPHY

Unit	Existing	Changes
I	UV-Visible Spectroscopy Principle - Instrumentation- selection rules - Types of electronic transitions in organic molecules -- Woodward-Fieser rules for calculation of λ max of conjugated dienes, unsaturated carbonyl compounds. Chromophore concept - auxochromes - bathochromic, hypsochromic, hyperchromic, hypochromic shifts. Types of absorption bands, solvent effects, Franck - Condon principle-Applications	EMR- Electromagnetic radiation
II	IR Spectroscopy Principle - Instrumentation - Selection rule - Vibrational modes of H ₂ O and CO ₂ - Degrees of freedom-Types of bands-Finger print region. Applications of IR spectra to identify inter and intra molecular hydrogen bonding - organic compounds analysis.	
III	NMR Spectroscopy Principle - Instrumentation - Solvents used - Number of signals - Equivalent and non-equivalent protons-Position of signals- Chemical Shift-Factors influencing chemical shifts- Peak area and proton coupling- Splitting of signals - Spin-Spin coupling- Coupling constant. NMR spectra of simple	



	molecules (Ethanol, Ethyl acetate, Ethylamine, Ethylbromide, Isopropyl ketone, Acetone, Anisole, Benzaldehyde and Toluene).	
IV	Mass Spectrometry Principle - Instrumentation- Mass spectrum - Molecular ion peak. Nitrogen rule-General fragmentation modes of simple molecules (Pentane, Ethyl benzene, Acetone, Ethanol and cyclohexene). Retro-Diels Alder reaction, McLafferty rearrangement	
V	Chromatography Paper chromatography - Principle - Solvents used - Development of chromatogram- Ascending, descending and radial paper chromatography - Applications. Thin layer chromatography – Principle – Choice of adsorbents and solvents, preparation of chromate plates - Rf values - Factors and significance. Column chromatography - Principle - Types of adsorbents, preparation of the column, elution, recovery of substances and applications.	

Percentage of Syllabus revised: 2%

Course Focuses on:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
<input checked="" type="checkbox"/> Intellectual Property Rights	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Social Awareness/ Environment	<input type="checkbox"/> Constitutional Rights/ Human Values/ Ethics



Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE1A4SA–GREEN CHEMISTRY

(New Course)

Unit	Content
I	Introduction to Green Chemistry Introduction of Green Chemistry-Twelve principles of green chemistry-Explanation. Planning a green synthesis-Percentage atom utilization-evaluating type of reaction involved-Selection of appropriate solvent-Reagent-protecting groups-Use of catalyst-energy requirement
II	Green synthesis Adipic acid, catechol, disodium iminodiacetate, Hoffmann elimination, Benzoic acid from methyl benzoate and toluene, Diels-Alder reaction, Decarboxylation, A safe marine antifoulant
III	Green reactions Introduction-Mechanism and application of Acyloin condensation-Aldol condensation-Arndt-Eistert synthesis-Baeyer-Villiger oxidation-Baker-Venkatraman Rearrangement-Barbier reaction-Barton reaction-Baylis-Hillman Reaction-Backmann rearrangement-Benzil-Benzilic rearrangement-Biginelli reaction.
IV	Aqueous phase, Solid state and PTC reactions Aqueous phase reaction-Hydolysis of methyl salicylate-Chalcone-p-ethoxy actanilide-p-acetamido phenol-Vanillidene acetone. SFE- Liquid CO ₂ in green synthesis. Solid state-Diphenyl carbinol-phenyl benzoate-azomethines. PTC reaction-phenylisocyanide-diphenyl-7-hydroxy-coumarin
V	Photochemical, Microwave, Sonication and Ionic liquid reactions Photochemical reactions-Benzopinacol, trans Azobenzene to cis-Azobenzene, trans stilbene to cis-stilbene. Microwave reactions-3-methyl-1-phenyl-5-pyrazolone, copper phthalocyanine. Sonication reaction-Butyraldehyde, 2-chloro-N-Aryl anthranilic acid. Ionic liquid reactions-1-Acetyl naphthalene, Ethyl-4-methyl-3-cyclohexene carboxylate.

Percentage of Syllabus revised: 100%



Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



M.Sc.-SYLLABUS REVISION

Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE2A4CA-SYNTHETIC ORGANIC CHEMISTRY

Unit	Existing	Changes
I	Synthon, synthetic equivalent, target molecule, Electron donors (nucleophiles), Electron acceptors (electrophiles), functional group interconversion, disconnection approach, importance of the order of events in organic synthesis. Chemo selectivity, one group C-C and C-X disconnection (disconnection of alcohols and carbonyl compounds).	
II	1,3 and 1,5 di functionalised compounds, α , β -unsaturated carbonyl compounds, control in carbonyl condensation, synthesis of 3, 5 and 6 membered rings in organic synthesis. Diels-Alder reaction. Retro synthesis of 5 and 6 membered heterocycles containing two nitrogens. Designing synthesis: Disconnection approach in Ibuprofen, Rosiglitazone and captopril.	
III	Need for protection and deprotection of functional groups during chemical reactions. Protection and cleavage of hydroxyl groups (by ethers)-MOM-Cl, THP and Protection and cleavage of hydroxyl groups (by esters) - trichloroacetate and 2,4,6-trimethylbenzoate. Protection and cleavage of 1,2 and 1,3-diols - Methylene dioxy derivative - methoxymethyleneacetal, ethyldieneacetal, Protection and cleavage of Amino groups - BOC, FMOC, N-Acetyl.	BOC - Butoxy Carbonylation FMOC - Fluorenyl Methoxy Carbonyl
IV	Bamford, Stevens reaction, McCombie reaction (Barton Deoxygenation), Corey-Chaykovsky reaction, Hosomi-Sakurai reaction, Julia olefination and its modifications, Nazarov cyclization - Weinreb ketone synthesis - Yamaguchi macro lactonization -McMurry reaction - Palladium based reactions: Negishi-Kumada - Fukuyama coupling - Tsuji-Trost reaction.	Suzuki coupling
V	Asymmetric synthesis - Control of stereochemistry, resolution - kinetic and DKR (Dynamic Kinetic Resolution), chiral pool,	Enzymatic resolution, chiral



	methods of asymmetric induction – Substrate, reagent and catalyst-controlled reactions, determination of enantiomeric and diastereomeric excess, enantio-discrimination.	chromatography
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Percentage of Syllabus revised: 10%

Course Focuses on:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
<input checked="" type="checkbox"/> Intellectual Property Rights	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Social Awareness/ Environment	<input type="checkbox"/> Constitutional Rights/ Human Values/ Ethics



Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE2A4CB - STATISTICAL

THERMODYNAMICS AND COMPUTATIONAL CHEMISTRY

Unit	Existing	Changes
I	<p>Statistical Thermodynamics-I</p> <p>Mathematical introduction - Theories of permutations and combinations – Laws of probability – Distribution laws – Gaussian distribution.</p> <p>Maxwell-Boltzmann statistics – Thermodynamic probability – Thermodynamic probabilities of system in equilibrium – Boltzmann expression for entropy – Stirling’s approximation – State of maximum thermodynamic probability – Legrangian multipliers – Thermodynamics probabilities of systems involving energy levels – Maxwell-Boltzmann distribution law – Evaluation of alpha and beta in M-B distribution law.</p>	<p>Gaussian distribution placed before Maxwell-Boltzmann distribution law.</p>
II	<p>Statistical Thermodynamics - II</p> <p>Bose-Einstein and Fermi-Dirac Statistics: Bose-Einstein distribution law – Entropy of Bose- Einstein gas -Plank distribution law for black body radiation – Fermi-Dirac distribution law – Entropy of a Fermi-Dirac gas – Heat capacity of electron gas and the heat capacity of metals – Helium at low temperature – Negative absolute temperature.</p>	
III	<p>Macromolecules</p> <p>Overview of polymers— structure and classification of polymers— kinetics and mechanism of free radical and ionic polymerizations— degree of polymerization— condensation and coordination polymerizations— Zeigler-Natta polymerization— copolymerization— molecular weight of polymers— number and weight average molecular weights— determination of molecular weight— light scattering and viscosity methods— gel permeation chromatography.</p>	<p>Chemical and Phase Equilibria</p> <p>Reaction free energy/ reaction potential - reaction isotherm and direction of spontaneity - Standard reaction</p>



		<p>free energy - its calculation from thermochemical, electrochemical and equilibrium data - Temperature coefficient of reaction free energy and equilibrium constant. Gibbs phase rule - its thermodynamic derivation - application of phase rule to three component systems - Formation of one pair and two pairs of partially miscible liquids - Common ion effect - Salting out</p>
IV	<p>Chemical and Phase Equilibria Reaction free energy/ reaction potential— reaction isotherm and direction of spontaneity— Standard reaction free energy— its calculation from thermochemical, electrochemical and equilibrium data— Temperature coefficient of reaction free energy and equilibrium constant. Gibbs phase rule— its thermodynamic derivation— application of phase rule to three component systems— Formation of one pair and two pairs of partially miscible liquids— Common ion effect— Salting out</p>	<p>Introduction to Computational Chemistry Introduction to cheminformatics - history and evolution of cheminformatics - use of cheminformatics,</p>



		prospects of cheminformatics - database management, cheminformatics database - introduction to molecular modeling and drug design.
V	<p>Introduction to computational chemistry</p> <p>Introduction to cheminformatics - history and evolution of cheminformatics - use of cheminformatics, prospects of cheminformatics - database management, cheminformatics database - introduction to molecular modeling and drug design.</p> <p>Concepts of computational chemistry - molecular mechanics: general features, bond stretching, angle bending, improper torsions, out of plane bending, non-bonded interactions, point charges, calculation of atomic charges, polarization, van der Waals interactions.</p>	<p>Application of Computational Chemistry</p> <p>Include Docking studies and Chemdraw</p>

Percentage of Syllabus revised: 50%

Course Focuses on:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
<input checked="" type="checkbox"/> Intellectual Property Rights	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Social Awareness/ Environment	<input type="checkbox"/> Constitutional Rights/ Human Values/ Ethics



Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name:222CE2A4DA– ENVIRONMENTAL CHEMISTRY

Unit	Existing	Changes
I	<p>Atmosphere, Energy and Environment</p> <p>Composition of Atmosphere, Atmosphere structure, Earth radiation balance, particles, ions and radicals in the Atmosphere chemical and photochemical reactions in the atmosphere- Oxygen and ozone chemistry - El Nino phenomenon Asian Brown cloud. Mineral Resources - Metals and Nonmetals - Wood- Major renewable and non-renewable resources for energy- Consumption and conservation</p>	Case Study
II	<p>Aquatic Pollution and Monitoring Techniques</p> <p>Aquatic environment- Polluting agents- Pesticides, insecticides- Cyclodiene organophosphates - Carbamates, detergents- Naphtheno aromatics-Radioactive materials- Coral-Reef crisis- Eutrophication. Mineral pollution- Copper, lead, mercury, selenium and chromium. Monitoring methods -Polarigraphic, neocuproine, dithizone, persulphate and phenanthroline. Tests for identifying phenols, pesticides, surfactants, tannin and lignin.</p>	Minamatta Disease Mercury pollution. Include general methods in monitoring methods.
III	<p>Air Pollution</p> <p>Sources of air pollution- Natural and manmade-Classification and effects of air pollutants -CO, CO₂, SO₂, SO₃, NO and NO₂- Hydrocarbon as pollutant- Reactions of hydrocarbons and effects - Particulate pollutants sources and effects of organic and Inorganic particulates - Greenhouse effect-Impact on global climate-Control measures-Role of CFC's -Ozone holes-Effects of ozone depletion- Smog components of photochemical smog-Effects of photochemical smog. Air pollutant accidents TCDD Bhopal disaster Chernobyl disaster</p>	Case Study
IV	Toxic chemicals in Environment- Impact of toxic chemicals on	Case Study



	enzymes- Effects of metals and metallic compounds-Sources, toxicology and health risks of iron, arsenic, cadmium, chromium, lead, mercury and nickel. Nuclear pollution-Sources effects of ionizing and non-ionizing radiation -Genetic and somatic effects- Effects of Cesium-137, Krypton-85, Iodine-131 and Strontium-90 - Storage of nuclear wastes disposal of nuclear wastes-Nuclear disasters and their management-some major nuclear accidents	
V	Analysis of pollutants- CO, NO, SO ₂ , H ₂ S, hydrocarbons and particulate matter. Analysis of ammonia, nitrate and nitrites, chlorides, fluorides, cyanides, sulphide, sulphate and phosphates, boron, silica and arsenic. Other techniques- Scrubbing – Cold trapping – Filtration - Cyclone separator - Gravity settling - Electrostatic precipitators and thermal precipitators	Case Study

Percentage of Syllabus revised: 10%

Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE2A4DB – CATALYSIS

Unit	Existing	Changes
I	<p>Fundamentals</p> <p>Fundamental aspects of catalysis - Homogeneous and Heterogeneous catalysis- Enzyme catalysis - Green catalysis - Nano catalysis-. The role of catalytic processes in modern chemical manufacturing - Organometallic catalysts - Catalysis in organic polymer chemistry - Catalysis in petroleum industry - Catalysis in environmental control.</p>	<p>Introduction to Catalysis</p> <p>Phase transfer catalyst</p> <p>Catalytic poison</p>
II	<p>Homogeneous catalysis</p> <p>Metal mediated C-C and C-X coupling reactions - Negishi and Nozaki-Hiyama, Buchwald-Hartwig, Ullmann coupling reactions. Directed Orthometalation -Rh and Ir catalyzed C-H activation reactions and their synthetic utility. Copper and rhodium based carbene and nitrene complexes, cyclopropanation. Introduction to N-heterocyclic carbene metal complexes</p>	<p>Ru, Os,</p> <p>Introduction to N-heterocyclic carbene metal complexes</p> <p>Mo, W</p>
III	<p>Characterization of solid catalysts</p> <p>Surface area - Structure, surface morphology, porosity, pore volume, diameter, particle size. Instrumentation and applications of X-ray diffraction, SEM and TEM and Auger spectroscopy to surface studies. TPD (Temperature Programmed Distortion), TPR (Temperature Programmed Reduction) for acidity and basicity of the catalysts. Boundary layer theory - Wolkenstein theory - Balanding's approach</p>	<p>AFM, BET</p>
IV	<p>Heterogeneous catalysis</p> <p>Adsorption isotherms, surface area, pore size and acid strength measurements, porous solids. Catalysis by metals - Semiconductors and solid acids - Supported metal catalysts - Catalyst preparation - Deactivation and regeneration - Ammonia synthesis -</p>	



	Hydrogenation of carbon monoxide -Hydrocarbon conversion - Selective catalytic reduction of alkenes - polymerization	
V	Photo catalysis Introduction to photocatalysis - Semiconductor as photo catalysts - Porphyrins - Phthalocyanines. Generation of hydrogen by photo catalysts, photocatalytic break down of water and harnessing utilizing solar energy, photocatalytic degradation of dyes, environmental applications.	

Percentage of Syllabus revised: 15%

Course Focuses on:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
<input checked="" type="checkbox"/> Intellectual Property Rights	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Social Awareness/ Environment	<input type="checkbox"/> Constitutional Rights/ Human Values/ Ethics



Name of the faculty: BAS

Board: Chemistry

Semester: II

Course Code/Name: 232CE2A2CC - MOLECULAR SPECTROSCOPY

Unit	Existing	Changes
I	<p>Microwave Spectroscopy</p> <p>Electromagnetic radiation - Interaction of electromagnetic radiation with molecules - Types of molecular spectroscopy - Factors affecting line width and intensity - Signal to noise ratio and resolving power.</p> <p>Microwave Spectroscopy - Rotation of molecules - Rotational spectra of rigid rotator, intensities of rotational lines, effect of isotopic substitution - Rotational spectrum of non-rigid rotator - Linear & symmetric top molecules - Stark effect. Applications of microwave spectroscopy - Determination of bond length, bond angle dipole moment and atomic mass from microwave spectra.</p>	
II	<p>Infrared and Electronic spectroscopy</p> <p>Electronic Spectra of diatomic molecules - Frank Condon principle- vertical transitions- Selection rules- Parity, symmetry and spin selection rules - Polarization of transitions- Russell Sanders coupling - Different types of electronic transitions- UV-Vis instrumentation.</p> <p>Infrared Spectroscopy: Vibrating diatomic molecule - Harmonic and anharmonic oscillators – Fermi resonance - Selection rules - Diatomic vibrating rotator - Vibrations of polyatomic molecules - Molecular vibrations, types of molecular vibrations, rotational vibrational spectra of linear and symmetric top molecules – Factors influencing vibrational frequencies - Fourier transformation in IR spectroscopy- Instrumentation.</p>	



<p>III</p>	<p>NMR Spectroscopy-I</p> <p>Nuclear spin states and NMR active nuclei, nuclear magnetic moments- mechanism of resonance absorption- Population of nuclear spin states. ¹H NMR Spectroscopy – Multiplicity – Coupling constant – First order and second order proton, Spin-spin splitting – Dependence of J on dihedral angle – Vicinal and geminal coupling constants – Karplus equation – Long range coupling constants – Factors influencing coupling constant, splitting of NMR signals- AB, AX and AMX types - Influence of stereochemical factors on chemical shift of protons.</p>	<p>Chemical shift, factors affecting chemical shift</p>
<p>IV</p>	<p>NMR Spectroscopy-II</p> <p>¹³C nucleus, chemical shifts, spin -spin splitting, double resonance techniques - Homonuclear and hetero nuclear decoupling, broad band decoupling, off resonance decoupling, ¹³C relaxation mechanism - Overhauser effect. FT and 2D NMR spectroscopy: FID, DEPT, J-resolved, H-H-COSY, C-H-COSY and NOESY spectra</p>	
<p>V</p>	<p>ESR Spectroscopy</p> <p>Theory - Electron spin - Electronic Zeeman effect – Presentation of the spectrum-EPR spectrum of hydrogen and methyl radicals (first order treatment) - g factors - Hyperfine splitting: nuclear spin interaction with electron spin - Hyperfine coupling constants - EPR spectra of organic radicals (AA and AB type). Theory of EPR spectroscopy – Spin densities and McConnell relationship – Factors affecting the magnitude of g and A tensors in metal species – Zero-field splitting and Kramers degeneracy - applications of EPR.</p>	

Percentage of Syllabus revised: 5%

Course Focuses on:



<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
<input checked="" type="checkbox"/> Intellectual Property Rights	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Social Awareness/ Environment	<input type="checkbox"/> Constitutional Rights/ Human Values/ Ethics



B.Sc.

SYLLABUS (NEW COURSE)

Name of the faculty: BAS

Board: Chemistry

Semester: IV

Course Code/Name: 222CE1A4EP- Chemistry-II

Unit	Content
	<p>Electrochemistry I</p> <p>Types of conductance-Electrolytic, specific, molar, equivalent - Cell constant- Ionic mobility-Transport number. Half reactions-Oxidation and reduction, electrochemical cells-Galvanic and electrolytic cells-Reversible cells.</p> <p>Practical</p> <ol style="list-style-type: none">1. Determination of strength of strong acid using Conductometer2. Determination of strength of mixture of acids using Conductometer
II	<p>Electrochemistry II</p> <p>Electrochemical series- Single electrode potential -Types of electrodes- Calomel electrode, standard hydrogen electrode, Ag/AgCl electrode- EMF- Cell representation – EMF and free energy.</p> <p>Practical</p> <ol style="list-style-type: none">3. Determination of strength of iron using potentiometer4. Determination of strength of strong acid using potentiometer
III	<p>Phase rule</p> <p>Introduction, degrees of freedom, phase reactions, conditions for equilibrium- Derivation of phase rule- One and two component system.</p> <p>Practical</p> <ol style="list-style-type: none">5. Determination of critical solution temperature using phenol water system6. Determination of transition temperature using naphthalene - biphenyl system
IV	<p>Qualitative Analysis</p> <p>Introduction - Dry reactions – Heating, flame tests; Wet reactions – Test tubes, Centrifuge tube, centrifugation, washing the precipitates through Buckner funnel- Sintered crucible, precipitation with hydrogen sulphide, Interfering anions and its</p>



	<p>elimination - Classification of cations into analytical groups (group separation only).</p> <p>Practical</p> <p>7. Qualitative analysis of Inorganic salt I</p> <p>8. Qualitative analysis of Inorganic salt II</p>
V	<p>Gravimetric Analysis</p> <p>Precipitation method, super saturation and precipitate formation- Conditions of precipitation, Precipitation from homogeneous solution- Fractional precipitation, sequestering agents.</p> <p>Practical</p> <p>9. Estimation of Nickel as Nickel DMG</p> <p>10. Estimation of Lead as lead sulphate</p>

Percentage of Syllabus revised: 100 %

Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



IDC**SYLLABUS (NEW COURSE)**

Name of the faculty: BAS

Board: Chemistry

Semester: II

Course Code/Name: 232CE1A2IA-CHEMISTRY IN TEXTILES

Unit	Content
I	Vegetable Fibres and Animal Fibres Classification of textile fibres- Essential and desirable properties of textile fibres- Cotton fibre –Physical and Chemical properties– Purification, Physical and Chemical properties of jute, silk and wool.
II	Regenerated and Synthetic Fibres Rayon – Different types of rayon- Manufacture, Physical and chemical properties of acetate rayon and viscose rayon - Preparation, properties and uses of Polyamide fibres (nylon 6 and 66), polyester (PET) and polyacrylonitrile (PAN).
III	Manufacture of Soap and Detergents Laundry soaps – Manufacture of soap (Hot process, cold process), composition of soap, Cleansing action of soap, types of soap, soapless detergents, chemical action of detergents, detergent manufacture, advantages of detergents.
IV	Stiffening Agents & Bleaches Finishes – Stiffening Agents – Starch (cold water and hot water), other stiffening agents, preparation of starch. Bleaching processes – Bleaching agents- H_2O_2 , NaOCl, bleaching powder and bio-bleaching and their properties- Bleaching of cotton, rayon, wool and synthetic fibers.
V	Stains, Dry cleaning and Laundry process Stains – Identification and classification, principles of stain removal. Stain removal– Food stains, paint, perfume, tar, turmeric and kum- kum. Dry cleaning using absorbents- Grease solvents. Types, mechanism and application of laundry blues and fluorescent brightening agents,

Percentage of Syllabus revised: 100 %



Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



IDC
SYLLABUS (NEW COURSE)

Name of the faculty: BAS

Board: Chemistry

Semester: II

Course Code/Name: 232CE1A2EP-Applied Chemistry

Unit	Contents
I	<p>Water</p> <p>Sources and impurities, Water quality parameters: Definition and significance of- Color, odour, turbidity, pH, hardness, alkalinity, TDS, COD and BOD, flouride and chloride. Municipal water treatment: primary treatment and disinfection (UV, Ozonation, breakpoint chlorination). Desalination of brackish water: Reverse osmosis.</p> <p>Practical</p> <ol style="list-style-type: none"> 1. Determination of total hardness of water by EDTA method. 2. Determination of permanent hardness of water by EDTA method 3. Estimation of HCl using Na₂CO₃ as primary standard and determination of alkalinity in water sample. 4. Determination of chloride content of water sample by argentometric method
II	<p>Amino acids, Peptides and Proteins</p> <p>Amino acids –Classification, zwitter ions – Peptides - Structure of proteins – Primary, secondary, tertiary and quaternary structure- Colour test for proteins, denaturation of proteins.</p> <p>Practical</p> <ol style="list-style-type: none"> 5. Identification of amino acids by paper chromatography 6. Colour test for proteins.
III	<p>Organic Compounds</p> <p>Preparation, properties and applications of aspirin, paracetamol benzoic acid, salicylic acid, benzaldehyde, actophenone, benzophenone and aniline.</p> <p>Practical</p> <ol style="list-style-type: none"> 7. Preparation of Methyl salicylate from Salicylic acid (esterification) 8. Preparation of aspirin from Salicylic acid (acetylation)
IV	<p>Processing of Milk</p> <p>Milk: General composition of milk - Physical properties of milk - Recknagel effect Viscosity and conductivity-Processing of Milk-Boiling -Pasteurization - Sterilization</p>



	<p>and homogenization –Adulterants – Detection of Preservatives and neutralizers - Estimation of calcium and fat.</p> <p>Practical</p> <p>9. Estimation of calcium in milk powder.</p> <p>10. Estimation of iodine in common salt.</p>
V	<p>Monosaccharide</p> <p>Classification – Occurrence – Preparation - Structural elucidation - Properties of Glucose and Fructose.</p> <p>Practical</p> <p>11. Estimation of glucose</p> <p>12. Analysis of simple mono saccharides</p>

Percentage of Syllabus revised: 100 %

Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



IDC
SYLLABUS (NEW COURSE)

Name of the faculty: BAS

Board: Chemistry

Semester: II

Course Code/Name: 232CE1A2EQ-BASIC CHEMISTRY

Unit	Contents
I	Solutions Normality, molarity, molality, mole fraction, mole concept. Primary and secondary standards – Preparation of standard solutions. Principle of Volumetric analysis (with simple problems). Practical <ol style="list-style-type: none">1. Estimation of oxalic acid by KMnO_4 using a standard oxalic acid solution2. Estimation of KMnO_4 by thiosulphate using a standard potassium dichromate solution
II	Acids and Bases Acid base theories – Strength of acids and bases – Equilibrium constant and Ionic constant of water- pH, pKa, pKb, Buffer solution, pH and pOH simple calculations. Practical <ol style="list-style-type: none">3. Estimation of HCl by NaOH using a standard oxalic acid solution4. Estimation of Na_2CO_3 by HCl using a standard Na_2CO_3 Solution.
III	Chemical Bonding Types of bonding - Ionic Bond: Nature of ionic bond, factors influencing the formation of ionic bond, Covalent and coordinate bond. Practical <ol style="list-style-type: none">5. Preparation of Inorganic Complexes: Tetraamminecopper (II)sulphate6. Preparation of Inorganic Complexes: Preparation of Hexathiourealead (II) nitrate.7. Preparation of Prussianblue.
IV	Basic Organic Chemistry Nomenclature, physical and chemical properties and preparation of carboxylic acid, amine, phenol, amide, ethanol and methanol Practical <ol style="list-style-type: none">8. Test for Phenols




	<p>9. Test for Amines</p> <p>10. Test for Acids</p>
V	<p>Volumetric Estimations</p> <p>Chemistry and application of oxidation and reducing agents- KMnO_4, $\text{K}_2\text{Cr}_2\text{O}_7$, LiAlH_4, NaBH_4.</p> <p>Practical</p> <p>11. Estimation of iron (II) by potassium dichromate using standard Mohr's salt solution</p> <p>12. Estimation iron (II) sulphate by KMnO_4 using a standard Mohr's salt solution</p>

Percentage of Syllabus revised: 100 %

Course Focuses on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
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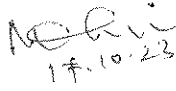

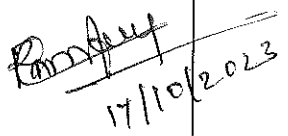
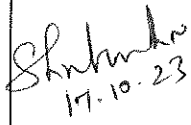

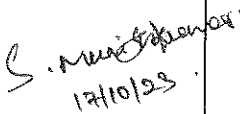
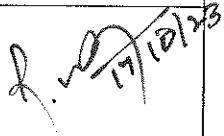


	Dr. N.G.P. ARTS AND SCIENCE COLLEGE (An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore) Approved by Government of Tamil Nadu and Accredited by NAAC with 'A++' Grade (3 rd Cycle- 3.64 CGPA) Dr. N.G.P. - Kalapatti Road, Coimbatore-641048, Tamil Nadu, India Web: www.dnmgpsc.ac.in Email: info@dnmgpsc.ac.in Phone: +91-422-2369100	BoS
		AY 2023-24

ATTENDANCE OF THE FORTEENTH BOARD OF STUDIES MEETING

Faculty: Basic and Applied Science

Board: Chemistry

S. No	Name	Designation	Signature
1.	Dr. M. SUGANTHI Associate Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48	Chairman	 17.10.23
2.	Dr. R. PRABHAKARAN Associate Professor, Department of Chemistry, Bharathiar University, Coimbatore-46	Vice Chancellor Nominee	 17/10/2023
3.	Prof. R. NANDHAKUMAR Professor of Applied Chemistry, School of Sciences Karunya Institute of Technology and Sciences, Coimbatore-114	Subject Expert	 17/10/2023
4.	Dr. SHUBHASHINI K SRIPATHI, Professor of Chemistry, School of Physical Sciences and Computational Sciences, Avinashilingam University, Coimbatore-43	Subject Expert	 17.10.23
6.	Mr. E. MUTHUSAMY Priyadarshini Chemicals Pvt. Ltd Nava India, Coimbatore-06	Industry Expert	 17/10/2023
7.	Mr. S. MUNISHKUMAR Supervisor, PSG Hospitals, Coimbatore -641004	Alumni	 17/10/23
8.	Dr. R. RAVIKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	 17/10/23
9.	Dr. M. R. EZHILARASI Associate Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	ABSENT

10.	Dr. M. DINESHKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>M.D.K</i>
11.	Mrs. P.KAVITHA Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>P.Kavitha</i> 17/10/23
12.	Dr. R. MENAKA Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>R.Menaka</i> 17/10/23
13.	Dr. M. MOHANRAJ Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>M.Mohanraj</i> 17/10/23
14.	Dr. R.RAJKUMAR Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>R.Rajkumar</i>
15.	Dr. P. AMARAVATHY Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>P.Amaravathy</i>
16.	Dr. S. SHYAM SIVAPPAN Assistant Professor, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Internal Member	<i>S.Sivappan</i>
17.	Dr. N. KUPPUCHAMY Professor & Head, Department of Tamil, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>N.Kuppu</i>
18.	Dr. R. VITHYA PRABHA Professor & Head, Department of English, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>R.V.P</i> 17/10/23
19.	Dr. K. GIRIJA Assistant Professor & Head, Department of Physics, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>K.Giri</i> 17/10/23
20.	Dr. R. SOWRIRAJAN Assistant Professor & Head, Department of Maths, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>R.Sowri</i>
21.	Dr. D. SRIDEVI Professor & Head, Department of Food Science & Nutrition, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>D.Sridevi</i> 17/10/23
22.	Dr. J. RENGARAMANUJAM Professor & Head, Department of Microbiology, Dr. N.G.P Arts & Science College, Coimbatore-48.	Co-opted member	<i>J.Rengan</i> 17/10/23
23.	Ms. R.AISHWARYA III B.Sc. Chemistry, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Student Representative	<i>R.Aishwarya</i>
24.	Mr. P. PERUMAL II M.Sc. Chemistry, Department of Chemistry, Dr. N.G.P Arts & Science College, Coimbatore-48.	Student Representative	<i>P.Perumal</i>

Date: 17/10/2023



M. Suganthi
17/10/23
(Dr. M. SUGANTHI)

BoS Chairman/Head
Department of Chemistry
Dr. N. G. P Arts and Science College
Coimbatore - 641 048