Department of Chemistry ::: Haflong Govt. College
Plan for Curriculum Implementation

Academic Session 2023-2024

Prepared by
Curriculum Implementation Committee
Department of Chemistry
Haflong Government College

Department of Chemistry :: Haflong Government College

Plan for Curriculum Implementation

The Department of Chemistry of Haflong Government College has made the following plan for implementation of the Curriculum of Three-year Degree Course under Choice Based Credit System (CBCS). The programme implemented as TDC (CBCS) Honours and TDC (CBCS) General for the Session 2023-24. The Curriculum is designed by Assam University.

The different units and topics of the TDC Honours and General Programme has been allotted to individual faculty as mentioned in the following table. Details of plan for each unit and topic will be designed by each of the faculty (the books here are referred by the University and availability at local place)

Odd Semester from July 2023 to December 2023
Plan for Implementation of B. Sc (Chemistry) Honours and B. Sc (Chemistry) General CBCS programme

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B. Sc First Semester Honours Programme as per NEP-2020 syllabus

Course No. CHM-DSC-101T, **Course Name:** Inorganic Chemistry-1 (Atomic Structure, Chemical Bonding and Metallurgy)

Contact Hours: 40, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Atomic Structure	J. D. Lee, Concise Inorganic Chemistry, ELBS, 1991. Puri, Sharma, Kalia; Principles of Inorganic Chemistry, Vishal Publishing Co. B. E. Douglas and D. H. Mc Daniel, Concepts & Model of Inorganic Chemistry, Oxford, 1970	Lecture, Tutorial Seminar & Assignment	Dewali Chakraborty
2	Periodicity of Elements	-do-	-do-	-do-
3	Chemical Bonding-I	-do-	-do-	-do-
4	Chemical Bonding-II	-do-	-do-	-do-
5	Oxidation-Reduction and Principles of Metallurgy	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 20 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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B. Sc First Semester Honours Programme

Course No. CHM-DSC-102T, **Course Name:** Physical Chemistry-1 (States of Matter and Solutions)

Contact Hours: 45, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Gaseous State-I	P. W. Atkins & J. Paula, de Atkin's Physical Chemistry W. D. Ball, Physical Chemistry. G. W. Castellan, Physical Chemistry. R. G. Mortimer, Physical Chemistry. Puri, Sharma, Pathania; Principles of Physical Chemistry.	Lecture, Tutorial Seminar & Assignment	Sanchayita Rajkhowa
2	Gaseous State-II	-do-	-do-	-do-
3	Liquid State	-do-	-do-	-do-
4	Solid State	-do-	-do-	-do-
5	Solutions	-do-	-do-	-do-

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B. Sc First Semester Minor Programme

Course No. CHM-DSM-101T, **Course Name:** Fundamental of Chemistry-1 (States of Matter and Solutions)

Contact Hours: 45, **Credit:** 03, **Full Marks** = 100, **Pass Marks = 40**

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Atomic Structure	Puri, Sharma, Kalia, Principles of Inorganic Chemistry. Puri, Sharma, Pathaniaa, Principles of Physical Chemistry. Arun Bahl and B. S. Bahl: Advanced Organic Chemistry. Sachin Kumar Ghosh, Advanced General Organic Chemistry: A Modern Approach (vol 1 & 2). M. K. Jain, S. C. Sharma, Modern Organic Chemistry.	Lecture, Tutorial Seminar & Assignment	Ponchami Sharma
2	Chemical Bonding and Molecular Structure	-do-	-do-	-do-
3	Gases	-do-	-do-	Jnyanashree Darabdhara
4	Liquids and Solids	-do-		-do-
5	Fundamentals of Organic Chemistry	-do-		-do-

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B. Sc First Semester (Skill Enhance Course) Programme

Course No. CHM-SEC-101T, **Course Name:** Separation and Purification Techniques,

Contact Hours: 60, **Credit**: 03, **Full Marks** = 70 , **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Solvent based Separation & Purification Techniques	S. M. Khopkar, Basic Concepts of Analytical Chemistry. D. A. Skoog, F. J. Holler & T. A. Nieman, Principles of Instrumental Analysis. O. Mikes, Laboratory Hand Book of Chromatographic & Allied Methods.	Lecture, Tutorial Seminar & Assignment	Sushanta Kumar Roy
2	Chromatographic Techniques	-do-	-do-	-do-
3	Ion exchange Chromatography	-do-	-do-	-do-
4	Metallurgical extraction	-do-	-do-	-do-
5	Case Studies	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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B. Sc First Semester (Skill Enhance Course) Programme

Course No. CHM-SEC-101L, **Course Name:** Separation and Purification Techniques

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
Part-1	a) Separation of components of binary solid mixture, Benzoic acid/p-Toluidine (solvent separation). (b) Extraction of lycopene/carotene from natural source by solvent extraction (extraction by ethyl acetate from aqueous brine mixture).	A. I. Vogel, A Textbook of Quantitative Inorganic Analysis. Subhas C Das, Advanced Practical Chemistry for 3-Year Honours Course. A. I. Vogel, A Textbook of Qualitative Organic Analysis. J. B. Jadav, Advance Physical Practical Chemistry. Ahluwalia, V. K. & Aggarwal, R. Comprehensive Practical Organic Chemistry, Honours Course.	Laboratory work	Sushanta Kumar Roy
Part-2	Preparation of TLC plate and separation of mixture of two organic/inorganic compounds and calculation of Rf values of the individual components.	-do-	Laboratory hand work	-do-

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B. Sc First Semester (Interdisciplinary Course) Programme

Course No. CHM-IDC-101T, **Course Name:** Fundamentals of Chemistry - I (Application of Chemistry in Everyday life)

Contact Hours: 45 h, Credit: 03, Full Marks = 100, Pass Marks = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Vitamins and minerals	Ashtoush Kar, Medicinal Chemistry. N. Shakuntala Many and S. Swamy, Foods, Facts and Principles. B. Srrilakshmi, Nutrition Science. G. Subalakshmi and S. A. Udipi, Food processing and preservation.	Lecture, Tutorial Seminar & Assignment	Dilip Chorei
2	Enzymes	-do-	-do-	-do-
3	Food preservation	-do-	-do-	-do-
4	Food additives	-do-	-do-	-do-
5	Chemistry of Materials:	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 20 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Plan for TDC Honours Programme for 3rd and 5th Semester from July 2023 to December 2023

The different units and topics thereof of the Courses of B. Sc (Chemistry Honours) Programme have been allotted to individual teachers as mentioned in the following tables. Details of plan for each unit and topic will be designed by each of the teachers to whom the units of the course/ courses are allotted. As per the guidelines of the university, internal assessment will be done by taking two unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations though the marks secured in Internal Assessment will not be reflected in the university conducted end semester examinations for each semester.

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B. Sc Third Semester (Honours) Programme

Course No. CHM-HCC-301T, **Course Name:** Inorganic Chemistry -II (S-, P- Block Elements and Metallurgy)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Chemistry of *s*- and *p*- Block Elements	J. D. Lee, Concise Inorganic Chemistry.	Lecture, Tutorial Seminar & Assignment	Sankar Neogi
2	Noble Gases	F. A. Cotton, & G. Wilkinson, Advanced Inorganic Chemistry.		
3	Acids and Bases	Shriver & Atkins, Inorganic Chemistry.		
4	Inorganic Polymers	-do-		
5	General Principles of Metallurgy	J. D. Lee, Concise Inorganic Chemistry.		

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-302T, **Course Name:** Organic Chemistry-II (Halogen and Oxygen Containing Functional Groups)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Chemistry of Halogenated Hydrocarbons	R. T. Morrison & R. N. Boyd, Organic Chemistry.	Lecture, Tutorial Seminar & Assignment	Dewali Chakraborty
2	Alcohols, Phenols, Ethers and Epoxides	I. L. Finar, Organic Chemistry (Volume 1).	-do-	-do-
3	Carbonyl Compounds	T. W. Graham Solomons, Organic Chemistry.	-do-	-do-
4	Carboxylic Acids and their Derivatives	-do-	-do-	-do-
5	Other Organic compounds	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-303T, **Course Name:** Physical Chemistry -III (Phase Equilibria and Chemical Kinetics)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Phase Equilibria I	A. S. Negi and S. C Anand, New Age International.	Lecture, Tutorial Seminar & Assignment	Kazi Kawsar Ahmed
2	Phase Equilibria II	-do-	-do-	-do-
3	Chemical Kinetics	K. J. Laidler, Chemical Kinetics.	-do-	-do-
4	Catalysis	Peter Atkins & Julio De Paula, Physical Chemistry.	-do-	-do-
5	Surface chemistry	-do-	-do-	-do-

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Course No. CHM-HCC-304L, **Course Name:** Inorganic Chemistry -II (Practical)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1. Part I	**Iodo-/Iodimetric Titrations** (i). Estimation of Cu (II) and $K_2Cr_2O_7$ using sodium thiosulphate solution (Iodimetrically). (ii). Estimation of (i) arsenite and (ii) antimony iodimetrically. (iii). Estimation of available chlorine in bleaching powder iodometrically.	A. I. Vogel, A Textbook of Quantitative Inorganic Analysis	Laboratory work & Assignment	Sankar Neogi
2. Part II	Inorganic preparations (i). Cuprous Chloride, Cu_2Cl_2. (ii). Preparation of Manganese (III) phosphate, $MnPO_4.H_2O$. (iii). Preparation of Aluminium potassium sulphate $KAl(SO_4)_2.12H_2O$ (Potash alum) or Chrome alum. (iv). Preparation of Chrome alum.	-do-	-do-	-do-

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Course No. CHM-HCC-305L, **Course Name:** Organic Chemistry – II (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1. Part I	**Test for functional groups** Alcohols, Phenols, Carbonyls and carboxylic acid	V. K. Ahluwalia & S. Dhingra, Comprehensive Practical Organic Chemistry: Qualitative Analysis.	Laboratory work & Assignment	Dewali Chakraborty
2.	**Organic preparations:** (i). Acetylation of one of the following compounds: amines (aniline, o-, m-, p-toluidines and o-, m-, p-anisidine) and phenols (β-naphthol, vanillin) by conventional/green approach method. (ii). Benzoylation of one of the following amines (aniline, o-, m-, p- toluidines and o-, m-, p-anisidine) and one of the following phenols (β-naphthol, resorcinol, p-cresol) by Schotten-Baumann reaction. (iii). Nitration of Acetanilide/nitrobenzene by conventional method. (iv). Nitration of Salicylic acid (preferably by green approach using ceric ammonium nitrate).	-do-	-do-	-do-

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Course No. CHM-HCC-306L, **Course Name:** Physical Chemistry -III (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1. Part-I	Study of the equilibrium of the following reactions by the distribution method: (i). I_2 (aq) + I^- = I_3^-(aq) (ii). Cu^{2+}(aq) + nNH_3= $Cu(NH_3)_n$	J. B. Jadav, Advance Physical Practical Chemistry.	Laboratory work & Assignment	Uttam Kumar Paul
2. Part-II	Study the kinetics of the following reactions (***any one***) (a). Initial rate method: Iodide-persulphate reaction. **(b).** Integrated rate method: Acid hydrolysis of methyl acetate with hydrochloric acid. **(c).** Integrated rate method: Saponification of ethyl acetate. (d). Comparison the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate. **(e).** Adsorption: Verification of the Freundlich isotherms for adsorption of oxalic acid /acetic acid on activated charcoal.	B. D. Khosla, V. C. Garg & A. Gulati, Senior Practical Physical Chemistry.	-do-	-do-

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Course No. CHM-SEC-301T **(Honours and Generals Course), Course Name:** Analytical Clinical Biochemistry, **Contact Hours:** 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Carbohydrates	T. G. Cooper: Tool of Biochemistry.	Laboratory work & Assignment	Uttam Kumar Paul
2	Proteins and Enzymes	Keith Wilson and John Walker: Practical Biochemistry	-do-	-do-
3	Lipids and Hormones	A. L. Lehninger: Biochemistry.	-do-	-do-
4	Blood and Urine:	G. P. Talwar and M Srivastava: Textbook of Biochemistry and Human Biology	-do-	-do-
5	Biochemistry of disease	-do-	-do-	-do-

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B. Sc Third Semester (General) Programme

Course No. CHM-DSC/GE-301T, **Course Name:** Organic Chemistry-II

(Solutions, Phase Equilibrium, Conductance, Electrochemistry and Functional Group)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Section A: Physical Chemistry** Solutions and Phase Equilibrium	G. M. Barrow: Physical Chemistry.	Lecture, Tutorial Seminar & Assignment	Kazi Kawsar Ahmed
2	Conductance and Electrochemistry	G. W. Castellan: Physical Chemistry.	-do-	-do-
3	**Section B: Organic Chemistry** Carbonyls (aliphatic and aromatic) and Carboxylic acids	R. T. Morrison & R. N. Boyd, Organic Chemistry.	-do-	-do-
4	Amines	I. L. Finar, Organic Chemistry (Volume 1)	-do-	-do-
5	Carbohydrates, Amino Acids, Peptides and Proteins	I. L. Finar, Organic Chemistry (Volume 2)	-do-	-do-

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Course No. CHM-DSC/GE-302L, **Course Name:** Practical

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Section A: Physical Chemistry:** **(I). Phase Equilibria:** (i). Construction of the phase diagram of a binary system (simple eutectic) using cooling curves. (ii). Determination of the critical solution temperature and composition of the phenol water system and study of the effect of impurities on it. (iii). Study of the variation of mutual solubility temperature with concentration for the phenol water system and determination of the critical solubility temperature.	A. I. Vogel: Textbook of Practical Organic Chemistry. V. K. Ahluwalia & R. Aggarwal, Comprehensive Practical Organic Chemistry.	Laboratory work & Assignment	Kazi Kawsar Ahmed
	(II). Conductance: (i). Determination of cell constant. (ii). Perform the following conductometric titrations: (a). Strong acid vs. strong base. (b). Weak acid vs. strong base.	-do-	-do-	-do-
2	**Section B: Organic Chemistry:** Systematic Qualitative Organic Analysis of Organic Compounds possessing mono-functional groups (-COOH, phenolic, aldehydic, ketonic, amide, nitro, amines) and preparation of one derivative.	-do-	-do-	-do-

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B. Sc Fifth Semester (Major) Programme

Course No. CHM-HCC-501T, **Course Name:** Organic Chemistry -IV (Biomolecules)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Nucleic Acids	J. M. Berg, J. L. Tymoczko, and L. Stryer, Biochemistry.	Lecture, Tutorial Seminar & Assignment	Sankar Neogi
2	Amino Acids, Peptides and Proteins	D. L. Nelson, M. M. Cox, and A. L. Lehninger, Principles of Biochemistry.	-do-	-do-
3	Enzymes	R. K. Murray, D. K. Granner, P. A. Mayes, and V. W. Harper's Rodwell, Illustrated Biochemistry.	-do-	-do-
4	Lipids	-do-	-do-	-do-
5	Pharmaceutical Compounds: Structure and Importance	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-502T, **Course Name:** Physical Chemistry -V (Quantum Chemistry & Spectroscopy)
Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Quantum Chemistry I	D. A. Macqurre, Quantum Chemistry.	Lecture, Tutorial Seminar & Assignment	Uttam Kumar Paul
2	Quantum Chemistry II	A. K. Chandra, Introductory Quantum Chemistry.	-do-	-do-
3	Molecular Spectroscopy I	C. N. Banwell, & E. M. McCash, Fundamentals of Molecular Spectroscopy.	-do-	-do-
4	Molecular Spectroscopy II	-do-	-do-	-do-
5	Photochemistry	K. K. Rohotgi, Fundamentals of Photochemistry. V. P. Sharma and R. Kumar, Pericyclic Reaction and Organic Photochemistry	-do-	-do-

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Course No. CHM-HCC-503L, **Course Name:** Organic Chemistry -V (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1.	**Part-I: Organic synthesis:** (a). Acetylation of salicylic acid, aniline, and hydroquinone, benzoylation of aniline and phenol. b). Aliphatic electrophilic substitution: preparation of iodoform from acetone/ethanol. (c). Aromatic electrophilic substitution: preparation of m-dinitrobenzene/preparation of methyl orange.	V. K. Ahluwalia & R. Aggarwal, Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis.	Laboratory work & Assignment	Sankar Neogi
2.	**Part-II: Organic quantitative analysis:** (a). Estimation of glucose/cholesterol/urea/uric acid by colorimeter or by chemical methods. (b). Determination of saponification equivalent of an ester.	I. V. Arthur, Quantitative Organic Analysis.	-do-	-do-

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Course No. CHM-HCC-504L, **Course Name:** Physical Chemistry -V (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Physical Experiments:** **(i).** Verification of Lambert-Beer's law and determine the concentration of $CuSO_4/KMnO_4/K_2Cr_2O_7$ in a solution of unknown concentration (ii). Determination of the concentrations of $KMnO_4$ and $K_2Cr_2O_7$ in a mixture. (iii). Study of the kinetics of iodination of propanone in acidic medium. (iv). Determination of the amount of iron present in a sample using 1,10-phenathroline. (v). Determination of the dissociation constant of an indicator (phenolphthalein) (vi). Study of the kinetics of interaction of crystal violet/ phenolphthalein with sodium hydroxide.	B. D. Khosla, V. C. Garg & A. Gulati, Senior Practical Physical Chemistry. C. W. Garland, J. W. Nibler & D. P. Shoemaker, Experiments in Physical Chemistry. A. M. Halpern & G. C. McBane, Experimental Physical Chemistry.	Laboratory work & Assignment	Uttam Kumar Paul

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Course No. CHM-DSE-501T **(Honours and General), Course Name:** Analytical Methods in Chemistry

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Qualitative and Quantitative aspects of Analysis	Arthur I Vogel, A Test book of Quantitative Inorganic Analysis.	Lecture, Tutorial Seminar & Assignment	Dewali Chakraborty
2	UV-Visible and IR Spectrometry	S. M. Khopkar, Basic Concepts of Analytical Chemistry.	-do-	-do-
3	Flame Atomic Absorption and Emission Spectrometry:	D. A. Skoog, F. J. Holler and T. A. Nieman, Principles of Instrumental Analysis.	-do-	-do-
4	Thermal and Electro-analytical Methods of Analysis:	R. V. Ditts, Analytical Chemistry–Methods of separation.	-do-	-do-
5	Separation Techniques:	D. A. Skoog, F. J. Holler and T. A. Nieman, Principles of Instrumental Analysis.	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-DSE-503L **(Honours and General), Course Name:** Analytical Methods in Chemistry

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Experiments** **(i).** Paper chromatographic separation of Fe^{3+}, Al^{3+}, and Cr^{3+}. (ii). Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the R_f values. (iii). Separate a mixture of Sudan yellow and Sudan Red by TLC technique and identify them on the basis of their Rf values. (iv). Chromatographic separation of the active ingredients of plants, flowers and juices by TLC. (v). Determine the pH of the given aerated drinks fruit juices, shampoos and soaps. (vi). Determination of Na, Ca, Li in cola drinks and fruit juices using flame photometric techniques. (vii). Analysis of soil: determination of pH of soil, total soluble salt, estimation of calcium, magnesium, phosphate, nitrate. (viii). Separation of metal ions from their binary mixture. (ix). Separation of amino acids from organic acids by ion exchange chromatography. (x). Determination of dissolved oxygen in water. (xi). Determination of chemical oxygen demand (COD).	S.M. Khopkar, Basic Concepts of Analytical Chemistry. Arthur I Vogel, A Test book of Quantitative Inorganic Analysis.	Laboratory work & Assignment	Dewali Chakraborty

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Course No. CHM-SEC-501T, **Course Name:** Chemistry of Cosmetics and Perfumes,
Contact Hours: 60, **Credit:** 04, **Full Marks** =50, **Pass Marks** = 20

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Hair dye, hair spray, shampoo, suntan lotions, face powder, lipsticks, talcum powder, nail enamel (General Study including composition and uses)	E. Stocchi: Industrial Chemistry. P. C. Jain, M. Jain: Engineering Chemistry. B. K. Sharma: Industrial Chemistry.	Lecture, Tutorial Seminar & Assignment	Kazi Kawsar Ahmed
2	Creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours	-do-	-do-	-do-
3	Essential oils and their importance in cosmetic industries with reference to Eugenol, Geraniol, sandalwood oil, eucalyptus, rose oil, 2-phenyl ethyl alcohol, Jasmone, Civetone, Muscone	-do-	-do-	-do-
4	**Preparation of the following:** (*any two*) 1. Preparation of talcum powder. 2. Preparation of shampoo. 3. Preparation of enamels. 4. Preparation of hair remover	-do-	-do-	-do-
5	Preparation of the following: (*any two*) 1. Preparation of face cream. 2. Preparation of nail polish 3. Preparation of nail polish remover.	-do-	-do-	-do-

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Even Semester from January 2024 to June 2024

Plan for Implementation of B. Sc (Chemistry) Honours and B. Sc (Chemistry) General Course programme

B. Sc Second Semester Honours Programme as per NEP-2020 Syllabus

Course No. CHM-DSC-151T, **Course Name:** Organic Chemistry-1 (Introductory Organic Chemistry)

Contact Hours: 60, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Basics concepts in Organic Chemistry	Sachin Kumar Ghosh, Advanced General Organic Chemistry: A Modern Approach. Morrison, R. N. & Boyd, R. N. Organic Chemistry	Lecture, Tutorial Seminar & Assignment	Jnyanashree Darabdhara
2	Aliphatic Hydrocarbon	M. K. Jain, S. C. Sharma, Modern Organic Chemistry.	-do-	-do-
3	Aromatic and Polynuclear hydrocarbon	-do-	-do-	-do-
4	Stereochemistry and Conformation analysis	E. L. Eliel & S. H. Wilen, Stereochemistry of Organic Compounds.	-do-	-do-
5	Carbohydrates	I. L. Finar, Organic Chemistry (Volume 1 & 2)	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 20 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-DSC-152L, **Course Name:** Practical (Organic, Inorganic and Physical Chemistry)
Contact Hours: 45, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Section A (Inorganic Chemistry)** 1(a). (i). Preparation of Chrome alum (ii). Tetraamminecopper (II) sulphate. (iii). Sodium Trioxalatochromate (III) (iv). Preparation of Aluminium potassium sulphate, Potash alum. (v). Preparation of Manganese (III) phosphate 1 (b). **Titrimetric Analysis** (i). Calibration of glass ware, pipette, burette and volumetric flask. (ii). Preparation of solutions of different Molarity/Normality	A. I. Vogel, A Textbook of Quantitative Inorganic Analysis. J. B. Jadav, Advance Physical Practical Chemistry. A. I. Vogel, A Textbook of Qualitative Organic Analysis. V. K. Ahluwalia & R. Aggarwal, Comprehensive Practical Organic Chemistry.	Laboratory work & Assignment	Dewali Chakraborty
2	**Section-B (Organic Chemistry)** **Preparation of derivative** Prepare a derivative of the given organic compound containing monofunctional group, recrystallize the derivative and determine the melting point. **Functional group** (a). -COOH (ester/amide/anhydride) (b). -CHO/ -CO- (phenyl hydrazone) (c). -OH (benzoate) (d). $-NH_2$ (benzamide) (e). $-NO_2$ (reduction)	-do-	-do-	-do-
3	**Section-C (Physical Chemistry)**	-do-	-do-	-do-

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	(a). To determine the surface tension of glycerol/acetic acid Solutions at different concentrations and construction of graph. **(b).** To determine the viscosity of glycerol/acetic acid Solutions at different concentrations and construction of graph. **(c).** Determination of transition temperature of the given substance by thermometric method (e.g., $MgSO_4/MnCl_2/Na_2SO_4.10H_2O$). **(d).** To determine the solubility of Salt ($BaCl_2$, KCl, KNO_3) in water at room temperature. **(e).** To determine the refractive index of a given liquid by Abbe refractometer and to find the specific and molar refraction.			

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Course No. CHM-DSM-151T, **Course Name:** Fundamentals of Chemistry -I
Contact Hours: 45, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Atomic Structure	Puri, Sharma, Kalia; Principles of Inorganic Chemistry	Lecture, Tutorial Seminar & Assignment	Sushanta Kumar Roy
2	Chemical Bonding and Molecular Structure	-do-	-do-	Sanchayita Rajkhowa
3	Gases	Puri, Sharma, Pathaniaa; Principles of Physical Chemistry	-do-	-do-
4	Liquids and Solids	-do-	-do-	Sushanta Kumar Roy
5	Fundamentals of Organic Chemistry	Sachin Kumar Ghosh, Advanced General Organic Chemistry: A Modern Approach (vol 1 & 2). M. K. Jain, S. C Sharma, Modern Organic Chemistry.	-do-	Dilip Chorei

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 20 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-SEC-151T, **Course Name:** Basic Analytical Chemistry,

Contact Hours: 60, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
	[A] Syllabus for Theory Component (50 Marks)			
1	Basic Concepts	A. I. Vogel, Vogel's Qualitative Inorganic Analysis.	Lecture, Tutorial Seminar & Assignment	Ponchami Sharma
2	Analysis of Soil and Water	A. I. Vogel, Vogel's Quantitative Chemical Analysis.	-do-	-do-
3	Analysis of Cosmetics	J. A. Dean, Analytical Chemistry Notebook.	-do-	-do-
4	Analysis of Food	D. A. Skoog, F. J. Holler & T. A. Nieman, Principles of Instrumental Analysis.	-do-	-do-
5	Case Studies	-do-	-do-	-do-
	[B] Project Work (30 Marks)		-do-	-do-
	One project work on water analysis/soil analysis/analysis of cosmetic/food analysis. Submission of the project report and presentation of the project in front of the examiner.		-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-IDC-151T, **Course Name:** Indian Chemistry Through the Ages

Contact Hours: 60, **Credit:** 03, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Basic Concepts in Chemistry	K. Timberlake and W. Timberlake, Basic Chemistry.	Lecture, Tutorial Seminar & Assignment	Dilip Chorei
2	Chemistry in Ancient India	P. C. Ray, P. Ray and B. G. Guha History of Chemistry in Ancient and Medieval India.	-do-	-do-
3	Chemical Arts and Crafts in Historic period	Ashoka Kumar Mishra. Ancient Indian Metallurgy.	-do-	-do-
4	Modern Indian Chemistry	-do-	-do-	-do-
5	Lives of Some Chemists from Modern India and Their Contributions in Chemistry	Chemical Research of Sir P. C. Ray, S. Goswami and S. Bhattacharya, Resonance. P. C. Ray. Life and Experiences of a Bengali Chemist, Vol I and II.	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 20 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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B. Sc Fourth Semester Honours Programme as per CBCS Syllabus

Course No. CHM-HCC-401T, **Course Name:** Inorganic Chemistry-III (Coordination Chemistry and its Applications)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Coordination Chemistry I	J. E. Huheey, Inorganic Chemistry F. A. Cotton & G. Wilkinson, Advanced Inorganic Chemistry.	Lecture, Tutorial Seminar & Assignment	Dilip Chorei
2	Coordination Chemistry II	-do-	-do-	-do-
3	Transition Elements	-do-	-do-	-do-
4	Lanthanoids and Actinoids	-do-	-do-	-do-
5	Bioinorganic Chemistry	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-402T, **Course Name:** Organic Chemistry-III (Heterocyclic Chemistry)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Nitrogen Containing Functional Groups	R. T. Morrison & R. N. Boyd, Organic Chemistry. I. L. Finar, Organic Chemistry (Volume 1 & 2). J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry.	Lecture, Tutorial Seminar & Assignment	Sankar Neogi
2	Heterocyclic Compounds - I	-do-	-do-	-do-
3	Heterocyclic Compounds - II	-do-	-do-	-do-
4	Alkaloids	-do-	-do-	-do-
5	Terpenes	-do-	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-403T, **Course Name:** Physical Chemistry-IV (Electrochemistry)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Conductance I	P. W Atkins & J. D. Paula, Physical Chemistry. G. W. Castellan, Physical Chemistry.	Lecture, Tutorial Seminar & Assignment	Uttam Kumar Paul
2	Conductance II	-do-	-do-	-do-
3	Electrochemistry I	do-	do-	do-
4	Electrochemistry II	do-	do-	do-
5	Electrical & Magnetic Properties of Atoms and Molecules	do-	do-	do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Course No. CHM-HCC-404L, **Course Name:** Inorganic Chemistry-III (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1. Part I	**Gravimetric Analysis:** (i). Estimation of nickel (II) using Dimethylglyoxime (DMG). (ii). Estimation of copper as CuSCN (iii). Estimation of iron as Fe_2O_3 by precipitating iron as $Fe(OH)_3$.	A. I. Vogel, A Textbook of Quantitative Inorganic Analysis.	Laboratory work & Assignment	Dilip Chorei
2. Part II	**Inorganic Preparations:** (i). Tetraamminecopper (II) sulphate, $[Cu(NH_3)_4]SO_4.H_2O$ (ii). Sodium trioxalatochromate (III). (iii). Tetraamminecarbonatocobalt (III) ion. (iv). Potassium tris(oxalate)ferrate (III)	-do-	-do-	-do-

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Course No. CHM-HCC-405L, **Course Name:** Organic Chemistry-III (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Qualitative Organic analysis** Detection of elements (N, S and halogens) and functional groups, determination of melting points and preparation of suitable derivatives to identify the given organic compounds (Preferable by capillary method)	V. K. Ahluwalia & R. Aggarwal, Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis.	Laboratory work & Assignment	Sankar Neogi

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Course No. CHM-HCC-406L, **Course Name:** Physical Chemistry-III (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Physical experiments:** 1. pH metric titration of HCl against standard NaOH. 2. To determine the strength of the given acid conductometrically using standard alkali solution. 3. Determination of equivalent conductances of a strong electrolyte at various dilutions and verification of Onsagar equation. 4. Determination of equivalent conductance, degree of dissociation and dissociation constant of a weak acid. 5. Conductometric titration of a mixture of strong and weak acid *vs* strong base. 6. pH metric titration of a mixture of strong and weak acid *vs* strong base. 7. Potentiometric titration of ferrous ammonium sulphate against standard $K_2Cr_2O_7/KMnO_4$ and determination of redox potential of Fe (II)- Fe (III) system.	J. B. Jadav, Advance Physical Practical Chemistry. B. D. Khosla, V. C. Garg & A. Gulati, Senior Practical Physical Chemistry.	Laboratory work & Assignment	Uttam Kumar Paul

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Course No. CHM-SEC-401T, **Course Name:** Fuel Chemistry

Contact Hours: 60, **Credit:** 04, **Full Marks** = 50, **Pass Marks** = 20

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.	P. C. Jain, M. Jain: Engineering Chemistry.	Laboratory work & Assignment	Uttam Kumar Paul
2	**Coal:** Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar bases chemicals.	E. Stocchi: Industrial Chemistry.	-do-	-do-
3	**Petroleum and Petrochemical Industry:** Composition of crude petroleum; Different types of petroleum products and their applications. Principle and process of fractional distillation, Cracking – Thermal and catalytic cracking; Qualitative treatment of non-petroleum fuels- LPG, CNG, LNG, bio-gas, fuels derived from biomass, fuel from waste; synthetic fuels – gaseous and liquids	P. C. Jain, M. Jain: Engineering Chemistry.	-do-	-do-
4	**Petrochemicals**: Vinyl acetate, Propylene oxide, Isoprene, Butadiene, Toluene and its derivatives Xylene.	-do-	-do-	-do-
5	**Lubricants:** Classification of lubricants, lubricating oils (conducting and non conducting), Solid and semisolid lubricants, synthetic lubricants. Properties of lubricants – viscosity index, cloud point, pore point.	-do-	-do-	-do-

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B. Sc Fourth Semester General Programme as per CBCS Syllabus

Course No. CHM-DSC/GE-401T, **Course Name:** Inorganic Chemistry – III (Coordination Chemistry and its Applications)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Section A: Inorganic Chemistry** Transition Series Elements (3d series)	J. E. Huheey, Inorganic Chemistry. F. A. Cotton & G. Wilkinson, Advanced Inorganic Chemistry.	Lecture, Tutorial Seminar & Assignment	Dilip Chorei
2	Coordination Chemistry	-do-	-do-	-do-
3	**Section B: Physical Chemistry Gases**	-do-	-do-	-do-
4	Liquids and Solids	-do-	-do-	-do-
5	Chemical Kinetics	-do-	-do-	-do-

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Course No. CHM-DSC/GE-402L, **Course Name:** Practical

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Section A: Inorganic Chemistry** **A.** Semi-micro qualitative analysis (two anions and two cations and excluding insoluble salts) out of the following: **Cations:** Pb^{2+}, Ag^{2+}, Bi^{3+}, Cu^{2+}, Cd^{2+}, Sn^{2+}, Fe^{3+}, Al^{3+}, Co^{2+}, Cr^{3+}, Ni^{2+}, Mn^{2+}, Zn^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+}, NH_4^+ **Anions:** CO_3^{2-}, NO_2^-, NO_3^-, SO_4^{2-}, Cl^-, Br^-, I^-, BO_3^{3-}, PO_4^{3-}. **B (i).** Estimate the amount of nickel present in a given solution as bis(dimethylglyoximato) nickel (II) or aluminium as oximate in a given solution gravimetrically. (ii). Determine the composition of the Fe^{3+}-salicylic acid complex solution by Job's method. (iii). Estimation of (*a*) Mg^{2+} or (*b*) Zn^{2+} by complexometric titrations using EDTA. (iv). Estimation of total hardness of a given sample of water by complexometric titration. (v). Determination of concentration of Na^+ and K^+ using Flame Photometry.	A. I. Vogel, Qualitative Inorganic Analysis A. I. Vogel, Quantitative Chemical Analysis	Laboratory work & Assignment	Dilip Chorei
2	**Section B: Physical Chemistry** (I). Surface tension measurement (use of organic solvents excluded). Determination of the surface tension of a liquid or a dilute solution using a stalagmometer. (II). Viscosity measurement (**use of organic solvents excluded**). Determination of the relative and absolute viscosity of a liquid or dilute solution using an Ostwald's viscometer. (III). **Chemical Kinetics** Compare the strengths of HCl and H_2SO_4 by studying kinetics of hydrolysis of methyl acetate.	-do-	-do-	-do-

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B. Sc Six Semester Honours Programme as per CBCS Syllabus

Course No. CHM-HCC-601T, **Course Name:** Inorganic Chemistry - IV (Organometallic Chemistry)

Contact Hours: 60, **Credit**: 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Organometallic Compounds - I	J. E. Huheey, E. A. Keiter & R. L. Keiter, Inorganic Chemistry, Principles of Structure and Reactivity.	Lecture, Tutorial Seminar & Assignment	Sankar Neogi
2	Organometallic Compounds - II	-do-	-do-	-do-
3	Reaction Kinetics and Mechanism	-do-	-do-	-do-
4	Catalysis by Organometallic Compounds	-do-	-do-	-do-
5	Principles in Qualitative Analysis	A. I. Vogel, Qualitative Inorganic Analysis.	-do-	-do-

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Course No. CHM-HCC-602T, **Course Name:** Organic Chemistry – V (Spectroscopy, Carbohydrates, Dyes and Polymers)

Contact Hours: 60, **Credit:** 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Organic Spectroscopy I	P. S. Kalsi, Textbook of Organic Chemistry. William Kemp, Organic Spectroscopy.	Lecture, Tutorial Seminar & Assignment	Dewali Chakraborty
2	Organic Spectroscopy II	-do-	-do-	-do-
3	Carbohydrates	J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry.	-do-	-do-
4	Dyes	I. L. Finar, Organic Chemistry, Volume 2: Stereochemistry and the Chemistry of Natural Products	-do-	-do-
5	Polymers	F. W. Billmeyer, Textbook of Polymer Science. V. R Gowariker, N. V. Viswanathan & J. Sreedhar, Polymer Science.	-do-	-do-

Continuous and Comprehensive Assessment (CCA): As per the guidelines of the university, internal assessment will be done by taking two-unit tests of 14 marks for each course in each semester. Qualifying the tests is mandatory for appearing in the end semester examinations and the better marks secured out of the two-unit tests will be counted in the university conducted end semester examinations.

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Principal
HAFLONG GOVT. COLLEGE
HAFLONG

01/08/23

(Dr. S. Neogi)
Head
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Head Dept. of Chemistry
Haflong Govt. College
Haflong

Course No. CHM-HCC-603L, **Course Name:** Inorganic Chemistry-IV (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Qualitative Inorganic Analysis** Qualitative analysis of mixtures containing 3 anions and 3 cations. Emphasis should be given to the understanding of the chemistry of different reactions. The following radicals are suggested: CO_3^{2-}, NO_2^-, S^{2-}, SO_3^{2-}, $S_2O_3^{2-}$, CH_3COO^-, F^-, Cl^-, Br^-, I^-, NO_3^-, BO_3^{3-}, $C_2O_4^{2-}$, PO_43-, NH_4^+, K^+, Pb^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+}, Sb^{3+}, Fe^{3+}, Al^{3+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ba^{2+}, Sr^{2+}, Ca^{2+}, Mg^{2+} Mixtures should preferably contain one interfering anion, or insoluble component e.g., BaSO4, SrSO4, PbSO4, CaF2 or Al2O3 or combination of anions e.g. $CO3^{2-}$ and $SO3^{2-}$, NO_2^- and $NO3^-$, Cl^- and Br^-, Cl^- and I^-, B^- rand I^-, $NO3^-$ and Br^-, $NO3^-$ and I^-.	Vogel's Qualitative Inorganic Analysis, Revised by G. Svehla.	Laboratory Work & Assignment	Sankar Neogi

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Course No. CHM-HCC-604L, **Course Name:** Organic Chemistry -V (Practical)

Contact Hours: 60, **Credit:** 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**The following experiments to be carried out** (i). Extraction of caffeine from tea leaves (ii). Preparation of sodium polyacrylate. (iii). Preparation of urea formaldehyde. (iv). Analysis of Carbohydrate: aldoses and ketoses, reducing and non-reducing sugars. (v). Identification of simple organic compounds by IR spectroscopy and NMR spectroscopy (Spectra to be provided). (vi). Preparation of methyl orange.	A. I. Vogel, Quantitative Organic Analysis. V. K. Ahluwalia, & R. Aggarwal, Comprehensive Practical Organic Chemistry: Preparation and Quantitative Analysis. V. K. Ahluwalia & S. Dhingra, Comprehensive Practical Organic Chemistry: Qualitative Analysis	Laboratory work & Assignment	Dewali Chakraborty

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B. Sc Six Semester General Programme as per CBCS Syllabus

Course No. CHM-DSE-601T, **Course Name:** Inorganic Materials of Industrial Importance

Contact Hours: 60 h, **Credit**: 04, **Full Marks** = 70, **Pass Marks** = 28

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	Silicate Industries	E. Stocchi: Industrial Chemistry, Vol-I. W. D. Kingery, H. K. Bowen, D. R. Uhlmann: Introduction to Ceramics.	Lecture, Tutorial Seminar & Assignment	Sushanta Kumar Roy
2	Fertilizers	-do-	-do-	-do-
3	Surface Coatings	J. A. Kent: Riegel's Handbook of Industrial Chemistry.	-do-	-do-
4	Batteries	B. K. Sharma: Engineering Chemistry.	-do-	-do-
5	Alloys	-do-	-do-	-do-

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Course No. CHM-DSE-602L, **Course Name:** Practical

Contact Hours: 60, Credit: 02, **Full Marks** = 30, **Pass Marks** = 12

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	**Experiments** (i). Determination of free acidity in ammonium sulphate fertilizer. (ii). Estimation of Calcium in Calcium ammonium nitrate fertilizer. (iii). Estimation of phosphoric acid in superphosphate fertilizer. (iv). Electroless metallic coatings on ceramic and plastic material. (v). Determination of composition of dolomite (by complexometric titration). (vi). Analysis of (Cu, Ni); (Cu, Zn) in alloy or synthetic samples. (vii). Analysis of Cement.	P. C. Jain, M. Jain: Engineering Chemistry. R. Gopalan, D. Venkappayya, S. Nagarajan: Engineering Chemistry. J. A. Kent: Riegel's Handbook of Industrial Chemistry. E. Stocchi: Industrial Chemistry.	Laboratory work & Assignment	Sushanta Kumar Roy

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Course No. CHM-DSE-603L, **Course Name:** Dissertation (Project Work)

Contact Hours: 60, Credit: 06, **Full Marks** = 100, **Pass Marks** = 40

Unit No.	Topics	Text Books	Mode of Teaching	Faculty
1	One project work on inorganic/organic/physical/analytical/biochemical/environmental/agricultural chemistry. Submission of the project report in bound form and presentation of the project in front of the external examiner.		Laboratory work & Assignment	Uttam Kumar Paul

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