## BS-Chemistry Week Wise Course Modules for Courses offered to Other Departments

#### **Department of Biochemistry**

**Course Title**: Fundamental Inorganic Chemistry **Course Code:** CHM-301 **Course Structure:** Theory (3), Lab (1)

Semester: BS-I Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Introduction to the major core chemistry.		1
Chapter 1: The Periodic Law and Periodicity		2
Development of Periodic Table: Doberiner Trieds, Newland's Octaves	1	3
Mendeleev's Periodic Table, Modern Periodic Law.		4
Quantum Numbers, Hund's rule and Aufbau principle, Periodic table		5
and Classification of elements based on s, p, d and f orbitals,	2	6
	2	7
		8
Group trends, and periodic properties in s, p, d and f block elements,		9
i.e., atomic radii, ionic radii, ionization potential, electron affinities,	•	10
electronagetivities, electropositivity, redox potential and	3	11
electrochemical series.		12
Chapter 2: Principles of Chemical Bonding		13
Types of chemical bonding: Ionic bond, covalent bond, coordinate		14
covalent bond, metallic bond and hydrogen bonding.		15
Lab: Laboratory Ethics and Safety Measures: Awareness about the	4	
toxic nature of chemicals and their handling, cleaning of glassware, safe laboratory operations.		16
Electron deficient molecules. Lewis structures and prediction of shapes		17
using VSPER model: shapes of molecule containing two, three, four electron pairs.		18
Lab: Qualitative Analysis: Analysis of four ions (two anions and two	5	19
cations) from mixture of salts.		
		20

Localized bond approach: theories of chemical bonding, valance bond		21
theory (VBT), hybridization of orbitals, sigma and pi bonds.		22
Lab: Quantitative Analysis: Volumetric Analysis based on Redox	6	23
reaction		24
Resonance, the delocalized bond approach to bonding: molecular		25
orbital theory (MOT) applied to diatomic molecules and poly atomic		25
molecules, three center bonds, bonding theory of metals and	7	26
intermetallic compounds		27
		28
Conductors, insulators, and semiconductors.		29
Lab: Quantitative Analysis: Volumetric Analysis based on	8	30
Iodometric and Iodimetric,		31
		32
MID TERM EXAM	9	
Chapter 3: Acids and Bases		33
Concepts of acids and bases including Arrhenious concept, Protonic	10	34
concept, Lewis concept,	-	35
		36
Lux-Flood concept, soft and hard acids and bases (SHAB) concept.		37
Lab: Ouantitative Analysis: Volumetric Analysis based on	11	38
Precipitation and Complexometric Reactions.		39
		40
Relative strength of acids and bases, significance of pH, pKa, pKb and		41
buffer solutions.		42
Lab: Quantitative Analysis: Gravimetric Analysis based on Estimation of Ni <sup>2+</sup>	12	43
Theory of indicators, solubility, solubility product, common ion effect		45
and their industrial applications. Leveling effect.		46
Lab. Quantitativa Analyzia Cravimatria Analyzia hagad an	13	47
Estimation of Ba <sup>2+</sup> .		48
Chapter 4: Chemistry of p-block		49
Chemistry and structure of p-block elements: Group trend.	14	50
characteristics applications of Boron family carbon family nitrogen		51
family, oxygen family, halogens and noble gases.		52

Structure of noble gases and their compounds such as hydrides,		53
clathrates, compounds with BF <sub>3</sub> and helides.	15	54
		55
		56
Chemistry and structure: types, preparation and applications of inter-	r- 16	57
halogens, pseudo-halogens and polyhalides		58
		59
		60
Lab: Quantitative Analysis: Determine percent of P and	17	61
P2O5 in a sample of ammonium phosphomolybdate.		62
		63
		64
FINAL TERM EXAM	18	

# **Department of Biochemistry**

**Course Title**: Fundamental Physical Chemistry **Course Code:** CHM-302 **Course Structure:** Theory (3), Lab (1) Semester: BS-II Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Chapter 1: Physical properties of matter		1
		2
Concept of ideal and real gases, state variables, equations of states	1	3
(ideal gas equation and van der waal equation)		4
Kinetic model of gases, collision diameter, mean free path and		5
collision frequency	2	6
Lab: Determination of viscosity and parachor values of liquids.	4	7
		8
Properties of liquid, surface tension, viscosity, refractive index and		9
polarity	3	10
Lab: Determination of percent composition of liquid solutions		11
viscometrically.		12
Homogeneous and heterogeneous solutions, types of interactions in		13
liquids, van der waal interactions and dipole-dipole interactions,	4	14
Hydrogen bonding,		15
		16

		17
Unit cell, crystal lattice, crystal system, miller indices, Crystalline and	5	18
	5	19
		20
Chapter 2: Thermodynamics		21
Thermodynamics system, surrounding, zeroth law of thermodynamics,	-	22
concept of equilibrium, first law of thermodynamics.	6	23
Lab: Determination of refractive index and molar refractivity.		24
Concept of internal energy, enthalpy, thermodynamic processes under		25
different conditions (isothermal, adiabatic, reversibility concept)	_	26
Lab: Determination of percent composition of liquid solutions by	7	27
refractive index measurements.		28
Second law of thermodynamics, concept of entropy and Gibbs free		29
energy	0	30
	ð	31
		32
MID TERM EXAM	9	
Chapter 3: Chemical Kinetics		33
Rate of reactions, order of reactions, molecularity, extent of reaction,		34
rate law	10	35
		36
Rate law of zero and first order reactions with examples and its		37
differential and integrated forms	11	38
	11	39
		40
Concept of half-life and mean life, factors affecting rates (Arrhenius		41
equation)		42
Lab: Determination of molecular weight of a compound by elevation	12	43
of boiling point (ebullioscopic method).		44
Chapter 4: Electrochemistry	13	45
		46
Introduction of algotrophomistry (iong in solution conductors	10	4-

resistance)		18
		40
Ohm's law, Kohlrausch law		<b>49</b>
	14	50
Lab: Determination of heat of solution by solubility method.		51
		52
		53
Concept of electrolysis, electrolytes, and electrode potentials.	15	54
	15	55
		56
	16	57
	10	58
Electrochemical cell (galvanic cell and electrolytic cell)		59
		60
Lab: Determination of heat of neutralization of an acid with a base.		61
	17	62
	17	63
		64
FINAL TERM EXAM	18	

### **Department of Biochemistry**

**Course Title**: Fundamental Organic Chemistry **Course Code:** CHM-401 **Course Structure:** Theory (3), Lab (1)

Semester: BS-III Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Chapter 1: Introduction to organic Chemistry		1
Organic chemistry-the chemistry of carbon compounds; the nature of	1	2
organic chemistry-a historical perspective.	-	3
		4
Localized and delocalized chemical bonding, Rules		5
Lab. Qualitative arganic analysis. Systematic identification of	2	6
Lab: Quantative organic analysis: Systematic identification of		7
organic compounds (monorunctional and simple bifunctional) and		0
preparation of their derivatives.		8
Concept of hybridization and shapes of organic molecules; resonance;		9
aromaticity;	2	10
	3	11
		12
Tautomerism; hyperconjugation; hydrogen bonding.	4	13
	-	14

Lab: Preparation of Suphanilic acid and dibenzyl acetone		15
Charter 2. Charter and Neurophtane of Original Charter ha		10
Chapter 2: Classes and Nomenciature of Organic Compounds:		1/
Classification of organic compounds (on the basis of Origin, structure,	5	10
and functional group)		20
Development of systematic nomenclature of organic compounds:		20
IUPAC nomenclature of hydrocarbons (Alkanes, Alkenes, Alkynes,		22
Alkyl Halides Alcohols Aldehydes Ketones Carboxylic Acids	6	23
Ethers, and Esters)		24
IUPAC nomenclature of heteroatom functional groups including		25
polycyclic system and compounds containing more than one		26
functional groups.	7	27
		28
Lab: Preparation of; methyl orange, dinitrobenzene from benzene,		29
isolation of caffeine.	0	30
	8	31
		32
MID TERM EXAM	9	
Chapter 3: Functional Group Chemistry		33
A brief introduction to the chemistry of hydrocarbons: Preparation and	10	34
Reaction of alkanes, alkenes, and alkynes	10	35
		36
A brief introduction to the chemistry of hydrocarbons; Preparation and		37
Reaction of alkyl halides, alcohols, and their derivatives.		38
	11	39
		40
A brief introduction to the chemistry of hydrocarbons; Preparation and		41
Reaction of phenols, amines, and their derivatives.		42
	12	43
		44
A brief introduction to the chemistry of hydrocarbons; Preparation and		45
Reaction of carboxylic acids and their derivatives.	10	46
	13	47
		48
Chapter 4: Applications of Chemistry		49
Use of organic compounds in industries, like medicinal,	14	50
		51

and pharmaceutical		
		52
Use of organic compounds in cosmetics, paints and pigments,		53
		54
Lab: Estimation of phenol (bromide-bromate method) and aniline	15	55
(bromide-bromate and acetylation methods).		
		56
Use of organic compounds in polymers		57
<b>I ab:</b> Equivalent weight of an acid (neutralization)	10	58
Lab. Equivalent weight of an acid (neutranzation).	16	59
		60
Lab: Identification of organic functional groups by I.R. spectroscopy.		46
	17	47
		48
FINAL TERM EXAM	18	

### **Department of Biochemistry**

**Course Title**: Fundamental Analytical Chemistry **Course Code:** CHM-403 **Course Structure:** Theory (3), Lab (1)

Semester: BS-IV Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Chapter 1: Introduction to analytical chemistry		1
		2
Historical background, Basic concepts (Definition, Types, and	1	3
Purpose/aim), Applications of analytical chemistry in various fields.		4
Chemical Analysis and its Types (classical, and Instrumental analysis,		5
Volumetric and gravimetric analysis).	2	6
		7
		8
Principal steps in chemical analysis and methods of chemical analysis	3	9
Analytical Process and steps involved in analytical process		10
Thatytear Process and steps involved in analytear process		11
		12
Analytical tools, tritimatric, spectroscopic, chromatographic, and their	4	13
		14

application in various fields of life.		15
		16
Sampling and Application (concept of sampling, sample, analyte,		17
population, census, factors that affect sample representativeness, and		18
Sampling techniques)	5	19
		20
Chapter-2: Measurements and Chemical Analysis		21
Concentration Units (Concentration, Percentage composition (Mole)	(	22
with numerical, Molarity, normality, molality formality, ppm, ppb)	0	23
		24
Stoichiometric calculations (Definition, Limiting ,excess reagent steps		25
in stoichiometry, and Calculation, numericals having Mole-mole,	7	26
mole-mass conversion)		27
		28
Lab: Lab safety and precautions		29
Lab: Introduction and calibration of glassware and instruments	8	30
	0	31
		32
MID TERM EXAM	9	
Chapter 3: Data Handling		33
Experimental errors, Types, and numericals. Accuracy, Precision,		34
limit of detection.	10	35
Lab: Determination of Cations and anions (mass measurement)		36
Evaluation of data, Quality of results, Quality assurances. Calibration		37
methods.	11	38
		39
		40
Chapter 4: Chemical Equilibria	10	41
General concept of Chemical equilibria, Types of equilibria, Acid base	14	43

Labe Asid hass tituations		44
Lab: Acid-base titrations		
PH scale, Buffer, Redox (Redox reactions, examples)		45
	13	46
Lab: Redox titrations	15	47
		48
Complexation (Complexes stability, complexes constant, Chelates,		49
examples and chelate effect)		50
Labe Complexation titrations	14	51
Lad: Complexation turations		50
Precipitation (digestion impurities in precipitate Washing and filtering		52
of precipitate) Gravimetric calculation		54
	15	55
		56
Solubility and solubility product, Ionic strength, activity and activity		57
coefficient, numericals	16	58
		59
		60
Titration Curves (Titration, Titrant, Titrand, Eqvivalnce point, end		61
point, detection of end point, indicators, Strong acid base titration)	17	62
		63
		64
FINAL TERM EXAM	18	

#### Department of Microbiology/Physics/Other Departments (excluding Biochemistry/Zoology) if they require this Course for their Academic Program(s))

**Course Title**: General Chemistry **Course Code:** CHM-300 **Course Structure:** Theory (3), Lab (1) Semester: BS-I Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Introduction to the major core chemistry	1	1
introduction to the major core enemistry.		2
Chapter 1: The Periodic Law and Periodicity		3
Development of Periodic Table: Doberiner Trieds, Newland's Octaves,		
endeleev's Periodic Table, Modern Periodic Law.		4
		-

	1	0
Quantum Numbers, Hund's rule and Aufbau principle, Periodic table		5
and Classification of elements based on s, p, d and f orbitals,	2	6
		7
		8
Group trends, and periodic properties in s, p, d and f block elements,		9
i.e., atomic radii, ionic radii, ionization potential, electron affinities,		10
electronagetivities, electropositivity, redox potential and	3	11
electrochemical series.		12
Chapter 2: Principles of Chemical Bonding		13
Types of chemical bonding: Ionic bond, covalent bond, coordinate		14
covalent bond, metallic bond and hydrogen bonding.		15
Lab: Laboratory Ethics and Safety Measures: Awareness about the	4	
toxic nature of chemicals and their handling, cleaning of glassware,		16
Electron deficient molecules. Lewis structures and prediction of shapes		17
electron pairs.		18
Localized bond approach: theories of chemical bonding, valance bond	5	19
theory (VBT), hybridization of orbitals, sigma and pi bonds.		20
		20
Resonance, the delocalized bond approach to bonding: molecular		21
orbital theory (MOT) applied to diatomic molecules and poly atomic		22
intermetallic compounds	6	23
I I I I I I I I I I I I I I I I I I I		24
Conductors insulators and semiconductors		24
		25
Lab: Qualitative Analysis: Analysis of four ions (two anions and two actions) from mixture of salts	7	20
cations) from mixture of saits.		21
Chapter 3: Acids and Bases		20
Concepts of acids and bases including Arrhenious concept. Protonic		30
concept, Lewis concept, Lux-Flood concept, soft and hard acids and	8	31
bases (SHAB) concept.		27
	0	34
WID IEKWIEAAWI   Delative strength of acids and bases significance of pU pKa pKh and	у 12	• -
Relative suchgui of actus and bases, significance of pri, pra, pro and	10	33

buffer solutions. Theory of indicators, solubility, solubility product.		34
common ion effect and their industrial applications. Leveling effect		35
common fon effect and then industrial applications. Levening effect.		36
Chapter 4: Thermodynamics		37
Thermodynamics system surrounding zeroth law of thermodynamics		38
concept of equilibrium, first law of thermodynamics.	11	39
Lab: Determination of heat of neutralization of an acid with a base.		
		40
Concept of internal energy, enthalpy, thermodynamic processes under		41
different conditions (isothermal, adiabatic, reversibility concept)		42
Second law of thermodynamics, concept of entropy and Gibbs free	12	43
energy		44
Chapter 5: Chemical Kinetics		45
Pate of reactions, order of reactions, molecularity, extent of reaction		46
rate law	10	47
	13	
Rate law of zero and first order reactions with examples and its differential and integrated forms		48
Concept of half-life and mean life, factors affecting rates (Arrhenius		49
equation)	14	50
	14	51
		52
Chapter 6: Functional Group Chemistry		53
A brief introduction to the chemistry of hydrocarbons; Preparation and	15	54
Reaction of alkanes, alkenes, alkynes, alkyl halides,	15	55
		56
Preparation and Reaction of alcohols, phenols, amines, carboxylic acids		57
and their derivatives.	16	58
	10	59
		60
		61
Lab: Qualitative Organic Analysis: Systematic identification of	17	62
organic compounds (monofunctional and simple bifunctional) and	1/	63
preparation of their derivatives		64
FINAL TERM EXAM	18	

#### **Department of Zoology**

**Course Title**: Fundamental Inorganic Chemistry **Course Code:** CHM-301 **Course Structure:** Theory (3), Lab (1)

Semester: BS-II Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Introduction to the major core chemistry.		1
Chapter 1: The Periodic Law and Periodicity		2
Development of Periodic Table: Doberiner Trieds, Newland's Octaves	1	3
Mendeleev's Periodic Table, Modern Periodic Law.		4
Quantum Numbers, Hund's rule and Aufbau principle, Periodic table		5
and Classification of elements based on s, p, d and f orbitals,	2	6
	2	7
		8
Group trends, and periodic properties in s, p, d and f block elements,		9
i.e., atomic radii, ionic radii, ionization potential, electron affinities,		10
electronagetivities, electropositivity, redox potential and	3	11
electrochemical series.		12
Chapter 2: Principles of Chemical Bonding	4	13
Types of chemical bonding: Ionic bond, covalent bond, coordinate		14
covalent bond, metallic bond and hydrogen bonding.		15
Lab: Laboratory Ethics and Safety Measures: Awareness about the toxic nature of chemicals and their handling, cleaning of glassware, safe laboratory operations.		16
Electron deficient molecules. Lewis structures and prediction of shapes		17
using VSPER model: shapes of molecule containing two, three, four		18
Lab: Qualitative Analysis: Analysis of four ions (two anions and two	5	19
cations) from mixture of salts.		20
Localized bond approach: theories of chemical bonding, valance bond		21
theory (VBT), hybridization of orbitals, sigma and pi bonds.	6	22
Lab: Quantitative Analysis: Volumetric Analysis based on Redox		23
reaction		24
Resonance, the delocalized bond approach to bonding: molecular	7	25

orbital theory (MOT) applied to diatomic molecules and poly atomic		26
molecules, three center bonds, bonding theory of metals and		27
intermetallic compounds		27
Conductors, insulators, and semiconductors.		29
		30
Lab: Quantitative Analysis: Volumetric Analysis based on	8	31
Todometric and Todimetric,		32
MID TERM EXAM	9	
Chapter 3: Acids and Bases		33
Concepts of acids and bases including Arrhenious concept, Protonic		34
concept, Lewis concept,	10	35
		36
Lux-Flood concept, soft and hard acids and bases (SHAB) concept.		37
I she Ossentite the Asselsment Well we do a finite have been		38
Lab: Quantitative Analysis: Volumetric Analysis based on	11	39
Precipitation and Complexometric Reactions.		40
Relative strength of acids and bases, significance of pH, pKa, pKb and		41
buffer solutions.	12	42
Lab. Quantitativa Analyzia Cravimatria Analyzia hazad an		43
Estimation of Ni <sup>2+</sup>		44
Theory of indicators, solubility, solubility product, common ion effect		45
and their industrial applications. Leveling effect.		46
I ab: Quantitativa Analysis: Gravimetric Analysis based on	13	47
Estimation of Ba <sup>2+</sup> .		48
Chapter 4: Chemistry of p-block		49
Chemistry and structure of p-block elements; Group trend,		50
characteristics, applications of Boron family, carbon family, nitrogen	14	51
family, oxygen family, halogens and noble gases.		52
Structure of noble gases and their compounds such as hydrides,		53
clathrates, compounds with $BF_3$ and helides.	15	54
		55 56
Chemistry and structure: types, preparation and applications of inter-		57
halogens, pseudo-halogens and polyhalides	14	58
		59
		60

Lab: Quantitative Analysis: Determine percent of P and		61
P2O5 in a sample of ammonium phosphomolybdate.	17	62
		63
		64
FINAL TERM EXAM	18	

### **Department of Zoology**

**Course Title**: Fundamental Organic Chemistry **Course Code:** CHM-401 **Course Structure:** Theory (3), Lab (1) Semester: BS-III Session: 2019-Onwards Credit Hours: 4 (3 + 1)

CONTENTS	WEEK	Lectures
Chapter 1: Introduction to organic Chemistry		1
Organic chemistry-the chemistry of carbon compounds: the nature of	1	2
organic chemistry-a historical perspective	1	3
organie enemistry a instorieur perspective.		4
Localized and delocalized chemical bonding, Rules		5
Lab. Qualitative organic analysis. Systematic identification of		6
Lab: Quantative organic analysis: Systematic identification of	2	7
preparation of their derivatives.		8
Concept of hybridization and shapes of organic molecules; resonance;		9
aromaticity;	3	10
		11
		12
Tautomerism; hyperconjugation; hydrogen bonding.		13
Lab. Dronosotion of Symbonilis asid and dihangyl asstance		14
Lab: Preparation of Suphannic acid and dibenzyl acetone	4	15
		16
Chapter 2: Classes and Nomenclature of Organic Compounds:		17
Classification of organic compounds (on the basis of Origin, structure,	=	18
and functional group)	5	19
		20
Development of systematic nomenclature of organic compounds;		21
IUPAC nomenclature of hydrocarbons (Alkanes, Alkenes, Alkynes,	6	22
Alkyl Halides, Alcohols, Aldehydes, Ketones, Carboxylic Acids,		23
Ethers, and Esters)		24

IUPAC nomenclature of heteroatom functional groups including		25
polycyclic system and compounds containing more than one		26
functional groups.	7	27
		28
Lab: Preparation of; methyl orange, dinitrobenzene from benzene,		29
isolation of caffeine.	Q	30
	o	31
		32
MID TERM EXAM	9	
		33
Chapter 3: Functional Group Chemistry		34
A brief introduction to the chemistry of hydrocarbons; Preparation and	10	35
Reaction of alkanes, alkenes, and alkynes	_	36
A brief introduction to the chemistry of hydrocarbons; Preparation and		37
Reaction of alkyl halides, alcohols, and their derivatives.		38
	11	39
		40
A brief introduction to the chemistry of hydrocarbons; Preparation and		41
Reaction of phenols, amines, and their derivatives.		42
	12	43
		44
A brief introduction to the chemistry of hydrocarbons; Preparation and		45
Reaction of carboxylic acids and their derivatives.		46
	13	47
		48
Chapter 4: Applications of Chemistry		49
Use of organic compounds in industries like medicinal	14	50
and pharmaceutical	17	51
		52
Use of organic compounds in cosmetics, paints and pigments,		53
Labe Detimation of above 1 (becauids because to method) and avilian		54
(bromide-bromate and acetylation methods)	15	55
(oronnae-oronnate and acceptation methods).		56
Use of organic compounds in polymers		57
<b>I ab:</b> Equivalent weight of an acid (neutralization)	16	58
Dav. Equivalent weight of all actu (neutralization).		59

		60
Lab: Identification of organic functional groups by I.R. spectroscopy.		46
	17	47
		48
FINAL TERM EXAM	18	

### **Department of Zoology**

**Course Title**: Environmental Chemistry **Course Code:** CHM-402 **Course Structure:** Theory (3), Lab (1) Semester: BS-IV Session: 2019-Onwards Credit Hours: 4 (3 + 1)

Introduction to Environment and Environmental Chemistry, Spheres of Environment, (a) Lithosphere, (b) Biosphere, (c) Atmosphere and (d) Anthrosphere Chapter 1: Atmospheric Chemistry Various Segments in Atmosphere, Temperature and Pressure Profile,133Temperature Inversion (Radiation Inversion), Introduction, Types and Pollution due to Temperature Inversion, Photochemical Smog (Conditions and Pollutants in photochemical smog), Types of smog Lab: Safety Rules and Regulations, Techniques in solution preparation267Raticulate Matter (Particulate Pollutants); Sources, Types and Classification of Particulate matter, Adverse effect of Particulate matter, Particulate Emission Control Mechanism Lab: The pH and Buffer Capacity of Environmental Waters.911131210Environmental Radioactivity; Impact of Radioactivity on human body, animals and Plants, Atmospheric Aerosols, Industrial Pollutants, Various industries in Pakistan and their Pollutants141516Acid Rain (Acid Deposition); Major Sources, Mechanism, Control, Effects on Building and Vegetation Lab: Inorganic and Organic Profiles of Soil and Sediment Cores.181920Global Warming (Green House Effect); Major Green House Gases responsible for global Warming, Causes of Green House gases, Control Measures, Global Impact Lab: Alkalinity of Water Samples.21	CONTENTS	WEEK	Lectures
Spheres of Environment, (a) Lithosphere, (b) Biosphere, (c) Atmosphere and (d) Anthrosphere Chapter 1: Atmospheric Chemistry Various Segments in Atmosphere, Temperature and Pressure Profile,12Temperature Inversion (Radiation Inversion), Introduction, Types and Pollution due to Temperature Inversion, Photochemical Smog (Conditions and Pollutants in photochemical smog), Types of smog Lab: Safety Rules and Regulations, Techniques in solution preparation5Particulate Matter (Particulate Pollutants); Sources, Types and Classification of Particulate matter, Adverse effect of Particulate matter, Particulate Emission Control Mechanism Lab: The pH and Buffer Capacity of Environmental Waters.9In11Environmental Radioactivity; Impact of Radioactivity on human body, animals and Plants, Atmospheric Aerosols, Industrial Pollutants, Various industries in Pakistan and their Pollutants141516Acid Rain (Acid Deposition); Major Sources, Mechanism, Control, Effects on Building and Vegetation Lab: Inorganic and Organic Profiles of Soil and Sediment Cores.111820Global Warming (Green House Effect); Major Green House Gases responsible for global Warming, Causes of Green House Gases responsible for global Warming, Causes of Green House gases, Control Measures, Global Impact Lab: Alkalinity of Water Samples.21	Introduction to Environment and Environmental Chemistry,		1
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