



# University of Science & Technology Meghalaya

## Department of...Chemistry Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....B.Sc.....

Semester: ...III.....

Name of the Course: INORGANIC CHEMISTRY-II .....

Course Code: .....BSC 301.....

Name of the Faculty: ...Dr. Mitali Paul.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
3	Chemistry of s and p block Elements	12			Test-I	
					Part of unit 3	
	Inert pair effect		DoC- 13/09/2021	Sequencing		
	Diagonal relationship	4		Teaching and learning		
	allotropy					
	catenation					
				Assesment	Test-II	
	Complex formation				Part of unit 3	
	Hydrides	3		Feedback		
	Beryllium compounds					
					Test-III	
	Boric acid, borates				Part of unit 3	
	Boron nitrides	5				
	borohydrides					
	Silanes, oxoacids					
	Interhalogen		DoE- 24/01/2022			

Suggested Books/Reference Books:

- 1.Lee, J.D. *Concise Inorganic Chemistry*, ELBS, 1991.
- 2.Cotton, F.A. & Wilkinson, G. *Advanced Inorganic Chemistry*, Wiley, VCH, 1999.
3. Miessler, G. L. & Donald, A. Tarr. *Inorganic Chemistry 4th Ed.*, Pearson, 2010.
- 4.Shriver & Atkins, *Inorganic Chemistry 5th Ed.*

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# University of Science & Technology Meghalaya

## Department of...Chemistry Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....M.Sc..... Semester:...III.....

Name of the Course:INORGANIC CHEMISTRY-III.....CourseCode: .....MSC 301.....

Name of the Faculty: ...Dr. Mitali Paul.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
4	Organometallic compounds in Catalysis	12			Test-I Part of unit 3	
			DoC- 05/11/2021		Part of unit 4	
	Hydrogenation	4		Sequencing		
	Fischer-Tropsch			Teaching and		
	Water gas shift reaction			learning		
					Test-II	
	Wacker oxidation				Part of unit 4	
	Hydroformylation	4		Assessment		
	Carboxylation					
	Monsanto acetic acid					
					Test-III	
	Polymerization				Part of unit 4	
	Asymmetric oxidation			Feedback		
	C-C bond formation	4				
	Activation of small molecules		DoE- 25/02/2022			

### Suggested Books/Reference Books:

- 1.Organometallic chemistry Vol I and II, M. Bochmann, Oxford
- 2.Applied organometallic chemistry and catalysis by R. Whyman, Oxford University press, (2001)
3. Heterogeneous catalysis, D. K. Chakrabartty and B. Vishanathan, New age Pub. 2008.
- 4.Organometallics by Eichenbroich Christoph,3rd Ed, Wiley VCH

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# University of Science & Technology Meghalaya

## Department of...Chemistry Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....B.Sc.....

Semester: ...III.....

Name of the Course: Organic, Inorganic and Physical Chemistry I Course Code: .....BSC 731.....

Name of the Faculty: ...Dr. Mitali Paul.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
1	Structure of atom	12	DoC- 18/09/2021		Test-I	
	Bohr's Theory			Sequencing Teaching and learning	Part of unit 1	
	Hydrogen spectra					
	De Broglie Equation	4				
	Heisenberg's uncertainty principle					
	Quantum numbers					
				Assesment	Test-II	
	Orbital, radial function			Feedback	Part of unit 1	
	Effective nuclear charge, Hund's rule	4				
	Aufbau & Pouli's principle					
				Test-III		
2	Chemical periodicity			Part of unit 2		
	Periodic table	4				
	Periodic variation					
	Of properties		DoE- 22/01/2022			

Suggested Books/Reference Books:

- 1.Principles of Inorganic Chemistry by Puri, Sharma and Kalia
- 2.Advanced Inorganic Chemistry by Tuli, Prakash and Basu
3. Concise inorganic chemistry by J.D. Lee

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# University of Science & Technology Meghalaya

## Department of...Chemistry Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....B.Sc.....

Semester: ...V.....

Name of the Course: DSE II INDUSTRIAL CHEMICALS AND ENVIRONMENT Course Code: ...BSC 507.....

Name of the Faculty: ...Dr. Mitali Paul.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
5	Biocatalysis	5	DoC- 11/09/2021		Test-I	
	Introduction	1		Sequencing Teaching and learning	Part of unit 5	
	Green Chemistry	2		Assesment	Test-II	
					Part of unit 5	
				Feedback		
	Chemical Industry	2			Test-III	
					Part of unit 5	
			DoE- 22/01/2022			

Suggested Books/Reference Books:

- 1.E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK.
- 2.J. A. Kent: *Riegel's Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
3. K. De, *Environmental Chemistry*: New Age International Pvt., Ltd, New Delhi.
4. S. M. Khopkar, *Environmental Pollution Analysis*: Wiley Eastern Ltd, New Delhi

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# University of Science & Technology Meghalaya

Department of: Chemistry

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B. Sc.

Semester:III

Name of the Course:Organic Chemistry-II CourseCode:BSC-302

Name of the Faculty: Dr. E Karim

## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
	<p><b>Chemistry of Halogenated Hydrocarbons:</b></p> <p><i>Alkyl halides:</i> Methods of preparation, nucleophilic substitution reactions – <math>S_N1</math>, <math>S_N2</math> and <math>S_Ni</math> mechanisms with stereochemical aspects and effect of solvent etc.; nucleophilic substitution vs elimination.</p> <p><i>Aryl halides:</i> Preparation, including preparation from diazonium salts. nucleophilic aromatic substitution; <math>S_{NAr}</math>, Benzyne mechanism. Relative reactivity of alkyl, allyl/benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.</p> <p>Organometallic compounds of</p>	10-12	By Feb. 20 <sup>th</sup>	(i) lecture, example, problem solving, assignment, group discussion etc.	<p>Test-I 30% of the unit</p> <p>Test-II Next 30% of the unit.</p> <p>Test-III Rest 40% of the unit.</p>	







**Suggested Books/Reference Books: As given in the syllabus**

- 1.
- 2.
- 3.
- 4.

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# University of Science & Technology Meghalaya

Department of: Chemistry

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B. Sc.

Semester:III

Name of the Course:Organic Chemistry-IV CourseCode:BSC-501

Name of the Faculty: Dr. E Karim

## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
	<ul style="list-style-type: none"> <li><b>Biological Chemistry</b></li> <li>Enzymes – Introduction, nomenclature and characteristics. Mechanism of enzyme action (a general picture); mechanism of action of the enzyme chymotrypsin as a peptidase.; co-enzyme, co-enzymes derived from niacin and thiamine, lipoic acid, co-enzyme A, energy production in biological system (role of ATP and ATP-ADP cycle), glycolysis and tricarboxylic acid cycle. Oxidative phosphorylation and ATP synthesis.</li> <li>Nucleic acids: Structure of purine and pyrimidine bases in nucleic acid (adenine, guanine, cytosine, uracil and thiamine) [no synthesis]. Structure of nucleosides, nucleotides and DNA, replication of DNA.</li> </ul>	10-12	By Feb. 20 <sup>th</sup>	(i) lecture, example, problem solving, assignment , group discussion etc.	Test-I 30% of the unit  Test-II Next 30% of the unit.  Test-III Rest 40% of the unit.	

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**Suggested Books/Reference Books:** As given in the syllabus

- 1.
- 2.
- 3.
- 4.

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....MSC..... Semester:.....3rd.....

Name of the Course : Inorganic Chemistry.....CourseCode: .....MSC-301.....

Name of the Faculty: .....Dr Durlov Saikia

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
I	Reaction Mechanism of Transition Metal Complexes	15	DoC -9/10/21 DoE-20/1/22	Study materials, online platform, ppt etc	Test-I (Unit-1 =30%)	
					Test-II (Unit 1= 30%)	

Suggested Books/Reference Books:

- 1.
- 2.
- 3.
- 4.

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..... Dr D Saikia.....

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....MSC..... Semester:.....1st.....

Name of the Course : Inorganic Chemistry.....CourseCode: .....MSC-101.....

Name of the Faculty: .....Dr Durlov Saikia

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
1	<b>Molecular Structure and Bonding.</b>	15	DoC -5/10/21 DoE-19/2/22	Study materials, online platform, ppt etc	Test-I (Unit-1 =30%)	
					Test-II (Unit-1= 30%)	

Suggested Books/Reference Books:

- 1.
- 2.
- 3.
- 4.

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..... Dr D Saikia.....

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....BSC..... Semester:.....1st.....

Name of the Course : Inorganic Chemistry.....CourseCode: .....BSC-101.....

Name of the Faculty: .....Dr Durlov Saikia

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
III	<b>Chemical Bonding:</b>	15	DoC -9/10/21 DoE-20/1/22	Study materials, online platform, ppt etc	Test-I (Unit-III=30%)	
					Test-II	

Suggested Books/Reference Books:

- 1.
- 2.
- 3.
- 4.

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# Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....BSC..... Semester:.....3RD.....

Name of the Course : Inorganic Chemistry.....CourseCode: .....BSC-301.....

Name of the Faculty: .....Dr Durlov Saikia

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
IV	Noble Gases:	15	DoC -20/09/21 DoE-20/1/22	Study materials, online platform, ppt etc	Test-I (Unit-IV=30%)	
					Test-II (Unit IV=30%)	

### Suggested Books/Reference Books:

- 1.
- 2.
- 3.
- 4.

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# University of Science & Technology Meghalaya

Department of...Chemistry.....

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: BSc Chemistry..... Semester:BSc 301.....

Name of the Course:inorganic Chemistry II (General Principles ofMetallurgy ).....CourseCode:  
...BSc 301.....

Name of the Faculty: ...Prof Manash Das

Gupta.....

## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
I	General Principles of Metallurgy	20			Test-I	
					Up to Ellingham Diagram	
					Test-II	
					Up to Electrolytic Reduction	
					Test-III	
					Up to Methods of Purification	

## Suggested Books/Reference Books:

1.Consise Inorganic Chemistry by J.D. Lee

2.

3.

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# University of Science & Technology Meghalaya

Department of...Chemistry.....

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: Bsc Chemistry..... Semester:...BSc

Chemistry.....

Name of the Course:Industrial Chemistry & Environment .....CourseCode:BSc  
507.....

Name of the Faculty: ...Prof Manash Das Gupta  
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## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
4	Energy & Environment	20			Test-I	
					Sources of Energy	
					Test-II	
					Up to Nuclear Fission & Fusion	
					Test-III	
					Disposal of Nuclear Wastes & Disaster Management	

Suggested Books/Reference Books:

1 Environmental Chemistry by A K Dey


2.

3.

4.

.....Manash Das Gupta.....

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# University of Science & Technology Meghalaya

Department of Chemistry.....

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: M Sc Chemistry..... Semester: MSc 3<sup>rd</sup> Semester .....

Name of the Course: Reactivity of Organometallic Compounds..... Course Code: MSc 301

Name of the Faculty: Prof Manash Das Gupta

## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
III	Reactivity Of Organometallic Compounds	20			Test-I	
					Up to Ligand Substitution	
					Test-II	
					Up to Migration Insertion Reactions	
					Test-III	
					Up to Nucleophilic & Electrophilic Attack	

### Suggested Books/Reference Books:

1. Inorganic Chemistry by Shriver & Atkins

2.

3.

4.

.....Manash Das Gupta .....

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# University of Science & Technology Meghalaya

Department of: Chemistry

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: MSc

Semester:III

Name of the Course:Organic Chemistry-III

CourseCode:MSC-302

Name of the Faculty: Dr. E Karim

## Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
III B	<b>B.Pericyclic reactions</b> -Main features of pericyclic reactions; Woodward-Hoffman rules, correlation diagram and FMO approaches; Electrocyclic reactions – conrotatory and disrotatory motions for $4n$ and $4n+2$ systems. Cycloadditions– antarafacial and suprafacial additions, [2+2] and [4+2] reactions, 1,3-dipolar cycloadditions and chelotropic reactions; Sigmatropic $[i,j]$ shifts of C-H and C-C bonds; Sommelet-Hauser, Claisen, thio-Claisen, Cope and aza-Cope rearrangements.		By Feb. 20 <sup>th</sup>	(i) lecture, example, problem solving, assignment , group discussion etc.	Test-I 50% of unit IV	
IV	<b>Bioorganic Chemistry II</b> <b>A.</b> Characteristics and properties of carbohydrates, monosaccharides, open chain and ring structure, Haworth and conformational representations, oxidation, determination of ring size, glycosides, anomeric effect; Oligosaccharides and Polysaccharides - sucrose and other oligosaccharides, starch, cellulose and other		By Dec. 15		Test-II Rest 50% of unit IV	

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**Suggested Books/Reference Books:** As given in the syllabus

- 1.
- 2.
- 3.
- 4.

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# University of Science & Technology Meghalaya

Department of...Chemistry.....

## Lesson Plan

Session: 2021-2022(Odd Semester)

Program: .....B.Sc.....

Semester: ...III.....

Name of the Course: ...Physical Chemistry III..

Course Code: ...BSC 303.....

Name of the Faculty: .....Dr. Nicholus Bhattacharjee.....


## Details Plan


Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
I	Concept of phases, components and degrees of freedom, derivation of Gibbs Phase Rule for nonreactive and reactive systems;	3	28/09/21 19/10/21	Chalk and board	Test-I	
	Clausius-Clapeyron equation and its applications to solidliquid, liquid-vapour and solid-vapour equilibria,	1	26/10/21	Chalk and board		
	phase diagram for one component systems, with applications.	2	02/11/21 09/11/21	Powerpoint/ Smart board		
					Test-II	
I	Phase diagrams for systems of solid-liquid equilibria involving eutectic, congruent and incongruent melting points, solid solutions.	2	16/11/21 23/11/21	Powerpoint/ Smart board		
	Three component systems, water-chloroform-acetic acid	2	30/11/21 07/12/21	Powerpoint/ Smart board		

	system, triangular plots.					
					Test-III	
I	Binary solutions: Gibbs-Duhem- Margules equation, its derivation and applications to fractional distillation of binary miscible liquids (ideal and nonideal), azeotropes, lever rule,	3	14/12/21 28/12/21	Chalk and board		
	partial miscibility of liquids, CST, miscible pairs, steam distillation.	2	04/01/22 11/01/22	Chalk and board		
	Nernst distribution law: its derivation and applications.	1	18/01/22	Chalk and board		

**Suggested Books/Reference Books:**

1. Physical Chemistry by Puri, Sharma & Pathania
2. Physical Chemistry by Atkins
3. Physical Chemistry by K L Kapoor

  
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Program: .....B.Sc.....

Semester: ...V.....

Name of the Course: ...Physical Chemistry V..

Course Code: ...BSC 502.....

Name of the Faculty: .....Dr. Nicholus Bhattacharjee.....

**Details Plan**

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks



I	Postulates of quantum mechanics, quantum mechanical operators, Schrödinger equation and its application to free particle and “particle-in-a-box” (rigorous treatment), quantization of energy levels, zero-point energy and Heisenberg Uncertainty principle;	3	23/10/21 30/10/21	Chalk and board	Test-I	
	wavefunctions, probability distribution functions, nodal properties,	2	01/11/21 05/11/21	Chalk and board		
	Extension to two and three dimensional boxes, separation of variables, degeneracy.	1	08/11/21	Chalk and board		
I	Qualitative treatment of simple harmonic oscillator model of vibrational motion: Setting up of Schrödinger equation and discussion of solution and wavefunctions.	3	13/11/21 20/11/21	Chalk and board	Test-II	
	Vibrational energy of diatomic molecules and zero-point energy.	3	22/11/21 29/11/21	Chalk and board		
	Angular momentum: Commutation rules, quantization of square of total angular momentum and z-component.	2	04/12/21 06/12/21	Chalk and board		
					Test-III	
I	Rigid rotator model of rotation of diatomic molecule. Schrödinger	3	11/12/21 18/12/21	Chalk and board		

	equation, transformation to spherical polar coordinates. Separation of variables. Spherical harmonics. Discussion of solution.					
	Qualitative treatment of hydrogen atom and hydrogen-like ions: setting up of Schrödinger equation in spherical polar coordinates,	3	20/12/21 01/01/22	Chalk and board		
	radial part, quantization of energy (only final energy expression). Average and most probable distances of electron from nucleus.	2	03/01/22 08/01/22	Chalk and board		

Suggested Books/Reference Books:

1. Physical Chemistry by Atkins
2. Quantum Chemistry by McQuarrie
3. Quantum Chemistry by Levine



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Program: .....M.Sc.....

Semester: ...III.....

Name of the Course: ...Physical Chemistry III..

Course Code: ...MSC 303.....

Name of the Faculty: .....Dr. Nicholas Bhattacharjee.....

Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
II	Ion-solvent interactions, the Born model, thermodynamic parameters of ion-solvent interactions,	3	07/10/21 28/10/21		Test-I	
	Debye-Huckel theory of ion-ion interactions,	2	04/11/21 11/11/21			
					Test-II	
II	extended Debye-Huckel equation, Debye Huckel limiting law,	2	18/11/21 25/11/21			
	Debye-Huckel-Onsagar treatment and its extension to ion-solvent interactions. Debye-Huckel-Bjerrum model.	2	02/12/21 09/12/21			
	The random walk model of ionic diffusion-Einstein Smoluchowski reaction.	1	16/12/21			
					Test-III	
IV	Structure of electrified interfaces.	2	23/12/21 30/12/21			
	Helmholtz, Guoy-Chapman,	1	06/01/22			
	Stern and Devanathan models.	1	13/01/22			

**Suggested Books/Reference Books:**

1. Modern Electrochemistry: An Introduction to an Interdisciplinary Area, Amulya K.N. Reddy, John O. Bockris, Springer, 2000.
2. Modern Electrochemistry 1: Ionics, John O. Bockris, A.K.N. Reddy, Springer, 1998
3. Modern Electrochemistry by Byrd and Folckner
- 4.



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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

**Session: 2021-2022(Odd Semester)**

Program: B Sc.

Semester: 5<sup>th</sup> semester

Name of the Course: Organic Chemistry IV

Course Code: BSC-501

Name of the Faculty: Dr Arabinda Chandra Nath

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
					Test-I	
Amino Acids, Peptides and Proteins	Amino acids, Peptides and their classification	1	20/09/2021	Offline class and pdf	Amino acids, Peptides and their classification, $\alpha$ -Amino Acids – Synthesis ionic properties and reactions. Zwitterions, pKa values isoelectric point and electrophoresis	
	$\alpha$ -Amino Acids – Synthesis	1		Offline class and pdf		
	ionic properties and reactions.	1		Offline class and pdf		
	Zwitterions, pKa values	1		Offline class and pdf		
	isoelectric point and electrophoresis	1		Offline class and pdf		
					Test-II	
	Study of peptides: Nomenclature and structure of mono, di and polypeptides	1			Study of peptides: Nomenclature and structure of mono, di and polypeptides determination of their primary structures-end group analysis methods of peptide synthesis, Synthesis of peptides using N-protecting, C-protecting and C-activating groups Solid-phase synthesis	
	determination of their primary structures-end group analysis	2		Offline class and pdf		
	methods of peptide synthesis	1		Offline class and pdf		
	Synthesis of peptides using N-protecting, C-protecting and C-activating	2		Offline class and pdf		

	groups					
	Solid-phase synthesis	1	20/01/2022	Offline class and pdf		

**Suggested Books/Reference Books:**

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2009) Harper's Illustrated Biochemistry. XXVIII edition. Lange Medical Books/ McGraw-Hill.
2. Nelson, D.L., Cox, M.M. and Lehninger, A.L. (2009) Principles of Biochemistry. IV Edition. W.H. Freeman and Co.
3. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. VIth Edition. W.H. Freeman and Co.

*Accepted*

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B Sc.

Semester: 5<sup>th</sup> semester

Name of the Course: Green Chemistry (DSE I)

Course Code: BSC-505A

Name of the Faculty: Dr Arabinda Chandra Nath

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
					Test-I	
Introduction to Green Chemistry	What is Green Chemistry? Need for Green Chemistry	2	04/10/2021	Offline class and pdf	What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry. Twelve principles of Green Chemistry with their explanations and examples; Designing a Green Synthesis using these principles; Prevention of Waste/ by products; maximum incorporation of the materials used in the process into the final products (Atom Economy); prevention/ minimization of hazardous/ toxic products; designing safer chemicals – different basic approaches to do so; selection of appropriate auxiliary substances (solvents, separation agents)	
	Goals of Green Chemistry Limitations/ Obstacles in the pursuit of the goals of Green Chemistry.	2	23/10/21	Offline class and pdf		
Principles of Green Chemistry and Designing a Chemical synthesis	Twelve principles of Green Chemistry with their explanations and examples;	2	25/10/21	Offline class and pdf		
	Designing a Green Synthesis using these principles; Prevention of Waste/ by products;	3		Offline class and pdf		Some extra classes to manage
	Atom Economy); prevention/ minimization of hazardous/ toxic products; designing safer chemicals – different basic approaches to do so; selection of appropriate auxiliary substances (solvents,	3		Offline class and pdf		

	separation agents					
					Test-II	
	green solvents, solventless processes, immobilized solvents and ionic liquids; energy requirements for reactions	3		Offline class and pdf	<p>green solvents, solventless processes, immobilized solvents and ionic liquids; energy requirements for reactions, use of microwaves, ultrasonic energy; selection of starting materials; avoidance of unnecessary derivatization – careful use of blocking/protecting groups; use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; designing of biodegradable products; prevention of chemical accidents; strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes</p> <p>Future Trends in Green Chemistry Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry; Proliferation of solventless reactions; oncovalent derivatization; Green chemistry in sustainable development</p>	
	use of microwaves, ultrasonic energy; selection of starting materials; avoidance of unnecessary derivatization – careful use of blocking/protecting groups;	3		Offline class and pdf		Some extra classes to manage
	use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; designing of biodegradable products; prevention of chemical accidents;strengthening/ development of analytical techniques to prevent and minimize the generation of hazardous substances in chemical processes	4	27/12/21	Offline class and pdf		
Future Trends in Green Chemistry	Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial green chemistry;	2	3/01/22	Offline class and pdf		
	Proliferation of solventless reactions; oncovalent derivatization; Green chemistry in sustainable development	2	17/01/2022	Offline class and pdf		

**Suggested Books/Reference Books:**

1. V.K. Ahluwalia & M.R. Kidwai: New Trends in Green Chemistry, Anamalaya Publishers (2005).
2. P.T. Anastas & J.K. Warner: Oxford Green Chemistry- Theory and Practical, University Press (1998).
3. A.S. Matlack: Introduction to Green Chemistry, Marcel Dekker (2001).



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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B Sc.

Semester: 3<sup>rd</sup> Semester

Name of the Course: Organic, Inorganic and Physical Chemistry-I Course Code: BSC-731

Name of the Faculty: Dr Arabinda Chandra Nath

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
<b>Gaseous state</b>					<b>Test-I</b>	
	Ideal gas equation, derivation of gas laws, Maxwell's speed and energy distributions	2	20/09/21	Offline class and pdf	Ideal gas equation, derivation of gas laws, Maxwell's speed and energy distributions (derivation excluded); distribution curves; different types of speeds and their significance, concept of equipartition principle, van der Waals equation, Virial equation, continuity of state, Boyle temperature, critical constants, specific heats and specific ratios, laws of partial pressure, vapour density and density method of determination of molecular weights, frequency of binary collisions, mean free path.	
	distribution curves; different types of speeds and their significance,	1		Offline class and pdf		
	equipartition principle, van der Waals equation, Virial equation, continuity of state,	1		Offline class and pdf		
	Boyle temperature, critical constants, specific heats and specific ratios	1		Offline class and pdf		
	density and density method of determination of molecular weights, frequency of binary collisions, mean free path.	2	3/11/21	Offline class and pdf		
<b>Liquid state and Solid state</b>					<b>Test-II</b>	

	Structure of liquids. Properties of liquids – surface tension, viscosity, vapour pressure and their determination.	2	10/11/21	Offline class and pdf	Structure of liquids. Properties of liquids – surface tension, viscosity, vapour pressure and their determination. Classification of solids, Laws of crystallography – (i) Law of constancy of interfacial angles (ii)	
	Classification of solids, Laws of crystallography – (i) Law of constancy of interfacial angles	1		Offline class and pdf	Law of rationality of indices (iii) Law of symmetry. Symmetry elements of crystals. Definition	
	(ii) Law of rationality of indices (iii) Law of symmetry. Symmetry elements of crystals.	1		Offline class and pdf	unit cell & space lattice. Bravais lattices, crystal system. Xray diffraction by crystals. Derivation of Braggs equation. Determination of crystal structure of NaCl.	
	Definition of unit cell & space lattice. Bravais lattices, crystal system. Xray diffraction by crystals	2		Offline class and pdf		
	Derivation of Braggs equation. Determination of crystal structure of NaCl.	1	12/01/22	Offline class and pdf		

#### Suggested Books/Reference Books:

1. Advanced Physical Chemistry, Gurdeep Raj, Krishna Prakashan Media (p) Ltd, 2011.
2. Physical Chemistry (Vol. 1 & 2), K.L. Kapoor, Macmillan, 2001.
3. A text book of Physical Chemistry by A. S. Negi and S. C. Anand, New Age International, 2007.
4. Principles of Physical Chemistry by B.R. Puri, L.R. Sharma, Madan S. Pathania, Vishal Publishing Company, 2008

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-22(Odd Semester)

Course: M Sc

Semester: 1stSemester

Name of the Paper: Organic Chemistry I

Paper Code: MSC-102

Name of the Faculty: DR ARABINDA CHANDRA NATH

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
<b>UNIT-II:</b>					<b>Test-I</b>	
<b>Reaction Mechanism</b>	Nucleophiles-definition, types-anionic, neutral, hard, soft, ambident.		01/11/2021	Offline class and pdf	A. Nucleophiles-definition, types-anionic, neutral, hard, soft, ambident. Reactivity effect of substrate structure, effect of attacking nucleophiles, leaving groups and reaction medium. Neighbouring group participation.	
	Reactivity effect of substrate structure,			Offline class and pdf		
	effect of attacking nucleophiles,			Offline class and pdf		
	leaving groups and reaction medium.			Offline class and pdf		
	Neighbouring group participation.			Offline class and pdf		
					<b>Test-II</b>	
	Nucleophilic substitution reactions- SN1, SN2 and SNi			Offline class and pdf	B. Nucleophilic substitution reactions- SN1, SN2 and SNi mechanism and stereochemistry. Aromatic Nucleophilic Substitution: The SNAr, SN1, benzyne and SRN1 mechanisms. Nucleophilic substitutions at an allylic, aliphatic trigonal and vinylic carbons. Isotope labeling and kinetic	
	SN1, SN2 and SNi mechanism and stereochemistry.			Offline class and pdf		
	Aromatic Nucleophilic Substitution:			Offline class and pdf		
	The SNAr, SN1, benzyne and SRN1 mechanisms. Nucleophilic substitutions at an			Offline class and pdf		

	allylic, aliphatic trigonal and vinylic carbons.				isotope effects	
	Isotope labeling and kinetic isotope effects		18/02/2022	Offline class and pdf		

**Suggested Books:**

1. Organic Chemistry (Vol-I) By- Finar, I. L., Dorling Kindersley (India) Pvt.Ltd.(Pearson Education)
2. Morrison, R. T. & Boyd, R.N. Organic Chemistry, Dorling Kindersley (India) Pvt.Ltd.(Pearson Education)
3. Organic Chemistry (Vol-II) By- Finar, I. L., Dorling Kindersley (India) Pvt..Ltd..(Pearson Education)
4. Peter Sykes, A Guidebook to Mechanism in Organic Chemistry, 6<sup>th</sup> Edition,(Pearson Education)

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: M Sc.

Semester: 3rd semester

Name of the Course: Organic Chemistry III

Course Code: MSC-302

Name of the Faculty: Dr Arabinda Chandra Nath

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
UNIT-II					Test-I	
Chemistry of amino acids, peptides and proteins	Classification of amino acids,, methods of preparations, reactions of amino acids.	2	5/10/21	Offline class and pdf	Classification of amino acids, methods of preparations, reactions of amino acids. Isoelectric point of amino acids and its determination Solid-phase synthesis Absolute configuration of amino acids. Peptides: peptide linkage, nomenclature of polypeptides	
	Isoelectric point of amino acids and its determination	1		Offline class and pdf		
	Solid-phase synthesis	1		Offline class and pdf		
	Absolute configuration of amino acids.	1		Offline class and pdf		
	Peptides: peptide linkage, nomenclature of polypeptides	1		Offline class and pdf		
				Offline class and pdf	Test-II	

	General principles of polypeptide synthesis,	1		Offline class and pdf	General principles of polypeptide synthesis, protection of amino and carboxylic groups. Determination of structure of peptides. Proteins: General properties, classification and detection of protein. Primary, tertiary, secondary and quaternary structures of proteins. Biosynthesis of amino acids.
	protection of amino and carboxylic groups.	1		Offline class and pdf	
	Determination of structure of peptides. Proteins:	1		Offline class and pdf	
	General properties, classification and detection of protein	1		Offline class and pdf	
	Primary, tertiary, secondary and quaternary structures of proteins. Biosynthesis of amino acids.	2	11/01/2022	Offline class and pdf	

#### Suggested Books/Reference Books:

1. Organic Chemistry: by I. L. Finer (Part I & II), Longman Group Ltd. (6th edition), (2009)
2. Lehniger Principles of Biochemistry by David L. Nelson & Michael M. Cox, Macmillan Worth Publishers (2011)
3. Organic Chemistry of Natural Products (Vol. I & II) by Gurdeep R. Chatwal, Himalaya Publishing House. (2013)
4. Pericyclic reactions: a mechanistic study by S.M. Mukherji, Macmillan Co. of India Ltd (2011)

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# University of Science & Technology Meghalaya

Department of CHEMISTRY

## Lesson Plan

Session: 2020-21(Odd Semester)

Course: MSC (PG) Semester: III

Name of the Paper: INORGANIC CHEMISTRY -III.

Paper Code:MSC-301

Name of the Faculty: JATINDRA NATH GANGULI

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
II	Organometallic Chemistry	13Lecture + 11Tutorials			Test-I	
	Introduction-Organometallic Chemistry		08.10.21	Off-line, PPT	From Electron Count to Metal Olefins	
	Electron Count-18-EAF Rule		18.10.21	Off-Line+ PDF		
	Tutorial-		22.10.21	Off-line		
	Meta Alkyls		25.10.21	Off-line+PDF		
	Tutorial-		29.10.21	Off-line		
	Metal-Olefin+ acetylene		01.11.21	Off-line+PDF		
	Tutorial		05.11.21	Off-line	Test-II	
	Metallocene complexes		08.11.21	Off-line+PDF	From Metallocene to N-hetero Carbene	
	Problem Solving-Tutorial		12.11.21	Off-line		
	Metal-Carbenes&Carbynes		15.11.21	Off-line+PDF		
	Problem Solving Tutorial		19.11.21	Off-line		
	Multidecar-complexes		22.11.21	Off-line+PDF		
	Tutorial		26.11.21	Off-line		
	M-Phosphine		29.11.21	Off-line+PDF		
	Tutorial		03.12.21	Off-line		
	N-Hetero Carbene		06.12.21	Off-line+PDF		
	Tutorial		10.12.21	Off-line		
	Fluxional Molecules		13.12.21	Off-line+ PDF	Test -III	
	Tutorial= Q+A		17.12.21	Off-line	From Fluxional	
	Characterization with IR		20.12.21	Off-line+ PDF	Molecules to	
	Characterization With NMR		27.12.21	Off-line +PDF	Characterization of Organometallic compounds by	



					IR +NMR	
	Tutorial		31.12.21			
	Revision L1		03.01.22			
	Tutorial		07.01.22			
	Revision L2		10.01.22			

#### Suggested Books:

1. All PDF Lecture Notes supplied in google classroom.
2. Books as given in Syllabus.



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## Lesson Plan

Session: 2020-21(Odd Semester)

Course: BSC (UG) Semester: V

Name of the Paper: INDUSTRIAL CHEMICALS AND ENVIRONMENT Paper Code: BSC-507B, DSE II

Name of the Faculty: JATINDRA NATH GANGULI

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
II	<b>Environment and Ecosystems</b>				<b>Test I</b>	
	Environment Chemistry Introduction- C, N, S-cycles		07.10.21	Off-line+PDF	From C, N, S-cycles to Air Quality Standards	
	Puja- Holiday		14.10.21	Off-line +PDF		
	Air -Pollution		21.10.21	Off-line +PDF		
	Air Quality Standards		28.10.21	Off-line +PDF		
	Kali-puja		04.11.21	Off line +PDF		
	Ozone hole		11.11.21	Off line +PDF		
	Green House Effect		18.11.21	Off line +PDF	<b>Test II</b>	
	Particulates		25.11.21	Off line +PDF	From Ozone hole to Desulfurization	
	Desulfurization		02.12.21	Off line +PDF		
	Hydrological Cycles		09.12.21	Off line +PDF		
	Water Pollution		16.12.21	Off line +PDF		
	Effluent treatment		23.12.21	Off line +pdf		
	Water Softening		30.12.21	Off line +PDF		
	Biodegradability		07.01.22	Off line +PDF	<b>Test III</b>	
	Revision L1		21.01.22	Off line	Water Pollution to	
					Biodegradability	

Suggested Books:

1. As PDF Lecture Notes supplied in google classroom.

2 Books as given in Syllabus.



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**Department of CHEMISTRY**

## Lesson Plan

Session: 2020-21(Odd Semester)

Course: BSC (UG) Semester: III

Name of the Paper: Inorganic Chemistry-II Paper Code: BSC- 301

Name of the Faculty: JATINDRA NATH GANGULI

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
II	Acid and Base				<b>Test I</b>	
	Introduction- Arrhenious theory		06.10.21	Off-line + PDF	From Bronsted to Lewis Acid-Base Concept	
	Puja-vacation		13.10.21			
	Bronsted-lowry Concept.		20.10.21	Off-line + PDF		
	Lewis Acid-Base Concept		27.10.21	Off-line + PDF		
	HSAB-Principles		03.11.21	Off-line + PDF		
	Application of HSAB		10.11.21	Off-line + PDF		
	Revision of Acid-Base		17.11.21		<b>Tet II</b>	
	Noble Gas-introduction		24.11.21	Off-line + PDF	From HSAB to Noble Gas Discovery	
	Noble Gas-discovery		01.12.21	Off-line + PDF		
	Xenon-fluorides		08.12.21	Off-line + PDF		
	Bonding of Xenon Compounds VSEPR + MO		15.12.21	Off-line + PDF		
	Other Noble gas Compounds		22.12.21	Off-line + PDF		
	Applications of Noble Gas		29.12.21	Off-line + PDF		
	Revision Noble Gas		05.01.22		<b>Test III</b>	
	Revision Noble Gas Compounds		12.01.22		Noble Gas compounds	

#### Suggested Books:

1. As PDF Lecture Notes supplied in google classroom.
- 2 Books as given in Syllabus.



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# University of Science & Technology Meghalaya

Department of Chemistry

## Lesson Plan

Session: 2021-22(Even Semester)

Course: ..... BSC .....

Name of the Paper: **PHYSICAL CHEMISTRY III**

Name of the Faculty: **Dr. Prasanta Baishya**

Semester: BSC 3<sup>rd</sup> Sem.

Paper Code: BSC 303

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
<b>Unit II</b>	<b>Chemical Kinetics</b>	10	10-09-21 -	Demonstration PPT, Lectures,	Test-I	
	Order and molecularity of a reaction,	1				
	rate laws in terms of the advancement of a reaction,	1				
	rate laws in terms of the advancement of a reaction,	1				
	differential and integrated form of rate expressions up to second order reactions	1				
	experimental methods of the determination of rate laws,	1				
	kinetics of complex reactions (i) Opposing reactions (ii) parallel reactions and	1				
	Kinetics of complex reactions (iii) consecutive reactions and their differential rate equations (steady-state approximation in reaction mechanisms) (iv) chain reactions.	1				
	Temperature dependence of reaction rates; Arrhenius equation; activation energy.	1				
	Collision theory of reaction rates,	1		Demonstration PPT, Lectures,	Test-II	
	Lindemann mechanism, qualitative treatment of the theory of absolute reaction rates.	1				
<b>Unit- 4</b>	<b>Surface chemistry:</b>	5				
	Physical adsorption, chemisorption	2				
	Adsorption isotherms, nature of adsorbed state.	3				

**Suggested Books:**

1. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma, Madan S. Pathania, Vishal Publishing Company,
2. Atkins Physical Chemistry, Peter Atkins and Julio D Paula, Oxford University Press
- 3.

  
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... **Prasanta Baishya** ...

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# University of Science & Technology Meghalaya

Department of Chemistry

## Lesson Plan

Session: 2021-22 (Odd Semester)

Course: ..... MSC .....

Semester: MSC 3<sup>rd</sup> Sem.

Name of the Paper: **Physical Chemistry III.**

Paper Code: **MSC 303**

Name of the Faculty: **Dr. Prasanta Baishya**

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit V:	<b>Catalysis</b>	<b>12</b>		Demonstration PPT, Lectures	Test -I	
	Catalysts, classification of catalysts.	1				
	Characterization of catalysts	1				
	methods of surface analysis, surface area, pore size, void fraction, particle size,	1				
	Mechanical strength, surface chemical composition, surface acidity and reactivity.	2				
	Phase transfer catalysts,	1		Demonstration PPT, Lectures	Test-II	
	Heterogeneous catalysts	2				
	mechanism and kinetics of heterogeneous catalysis-Langmuir-Hinshelwood model,	2				
	Eley-Riedel model) shape and size selectivity of catalysts.	1				
	Clays and zeolites.	1				

### **Suggested Books:**

1. Atkins Physical Chemistry, Peter Atkins and Julio D Paula, Oxford University Press
2. Chemical Kinetics, 3rd Edition, K.J. Laidler, (Mc-Graw Hill Inc.) New York, 2007.
3. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma, Madan S. Pathania, Vishal Publishing Company

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B.Sc.Semester:3<sup>rd</sup>

Name of the Course:ORGANIC CHEMISTRY-II Course Code:302

Name of the Faculty: Dr. Golam Mohiuddin

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-2	Alcohols: preparation, properties and relative reactivity, Bouvaelt-Blanc Reduction; Preparation and properties of glycols: Oxidation by periodic acid and lead tetraacetate, Pinacol-Pinacolone rearrangement.	6	24-09-21 to 29-10-21	Dissertation, PPT, Quizzes	Test-I	
					Test-II	
Unit-2	Phenols: Preparation and properties; Ring substitution reactions, Reimer-Tiemann and Kolbe's-Schmidt Reactions, Fries and Claisen rearrangements with mechanism	5	03-11-21 to 19-11-21	Dissertation, PPT, Quizzes		
					Test-III	
Unit-2	Ethers and Epoxides: Preparation and reactions with acids. Reactions of epoxides with alcohols, ammonia derivatives and LiAlH <sub>4</sub>	4	24-11-21 to 10-12-21	Dissertation, PPT, Quizzes		

Suggested Books/Reference Books: (1).Morrison, R. T. & Boyd, R. N. Organic Chemistry, (2).Finar, I. L. Organic Chemistry (Volume I),

Golam Mohiuddin

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B.Sc. Semester: 3<sup>rd</sup>

Name of the Course: PHARMACEUTICAL CHEMISTRY Course Code: 306 A

Name of the Faculty: Dr. Golam Mohiuddin

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-1	antibiotics (Chloramphenicol); antibacterial and antifungal agents (Sulphonamides; Sulphanethoxazol, Sulphacetamide, Trimethoprim); antiviral agents (Acyclovir),	6	29-10-21 to 26-11-21	Dissertation, PPT, Quizzes	Test-I	
					Test-II	
Unit-1	Central Nervous System agents (Phenobarbital, Diazepam), Cardiovascular (Glyceryl trinitrate), antilaprosy (Dapsone), HIV-AIDS related drugs (AZT-Zidovudine).	5	03-11-21 to 31-12-22	Dissertation, PPT, Quizzes		
					Test-III	
Unit-2	(ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.	4	07-01-22 to 21-01-22	Dissertation, PPT, Quizzes		

Suggested Books/Reference Books: (1).G.L. Patrick: Introduction to Medicinal Chemistry; (2).Hakishan, V.K. Kapoor: Medicinal and pharmaceutical Chemistry

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: B.Sc. Semester: 5<sup>th</sup>

Name of the Course: ORGANIC CHEMISTRY-IV Course Code: 501

Name of the Faculty: Dr. Golam Mohiuddin

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-1	Classification and nomenclature, details of monosachharides.	6	25-09-21 to 30-10-21	Dissertation, PPT, Quizzes, Home Work	Test-I	
	Reaction of glucose and fructose with Br <sub>2</sub> , HCN, Tollen's and Fehling's solution,					
	Reaction with hydroxylamine, phenylhydrazine, HNO <sub>3</sub> and osazone formation.					
Unit-1	Pyranose and furanose structures.	6	06-11-21 to 11-12-21	Dissertation, PPT, Quizzes, Home Work	Test-II	
	Determination of ring size. Haworth projection formula, configuration of glucose and fructose.					
	Epimerization, inter-conversion of aldoses and ketoses. Ascending and descending series.					
Unit-1		4	18-12-21 to 08-01-22	Dissertation, PPT, Quizzes, Home Work	Test-III	
	Disaccharides: Maltose and sucrose – their reactions and structure, structure of cellulose and starch					

Suggested Books/Reference Books: (1).Nelson, D.L., Cox, M.M. and Lehninger, A.L. (2009) Principles of Biochemistry,

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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2021-2022(Odd Semester)

Program: M.Sc. Semester: 3<sup>rd</sup>

Name of the Course: Applications of Spectroscopy Course Code: 304

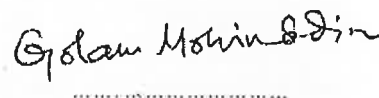
Name of the Faculty: Dr. Golam Mohiuddin

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule Unit wise (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-1	Basics of IR Spectroscopy.	6	07-10-21 to 04-11-21	Dissertation, PPT, Quizzes, Home Work	Test-I	
	Characteristic vibrational frequencies of alkanes, alkenes, alkynes,					
	Vibrational frequencies aromatic compounds, alcohols, ethers, phenols, amines					
					Test-II	
Unit-1	Detailed study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides, acid anhydrides, lactones, lactams, conjugated carbonyl compounds);	6	09-11-21 to 25-11-21	Dissertation, PPT, Quizzes, Home Work		
					Test-III	
Unit-1	Effects of H-bonding and solvent effect on vibrational frequency, extension to various organic molecules for structural assignment	4	30-11-21 to 16-12-21	Dissertation, PPT, Quizzes, Home Work		

Suggested Books/Reference Books: (1).C. N. Banwell & E. M. McCash. Fundamentals of Molecular Spectroscopy, (2) Introduction to Spectroscopy by D.L. Pavia, G. M. Lampman, G. S. Kriz, Harcourt

  
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# University of Science & Technology Meghalaya

## Department of Chemistry

### Lesson Plan

Session: 2020-21(Even Semester)

Course: B.Sc. ....

Semester: 3rd.....

Name of the Paper: Organic Chemistry-II.....

Paper Code: BSC 302.....

Name of the Faculty: Dr. Sarifuddin Gazi.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-3	Carbonyl Compounds	13	DoC-15/09/2021 DoE-15/12/2021	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-I U-3 (50%)  Test-II remaining U-3 (50%)	
Unit-5	Sulphur containing compounds	4	DoE-22/12/2021 DoE-19/01/2022	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-III U-3 (100%)	

### Suggested Books:

1. Finar, I. L. Organic Chemistry (Volume 1)
2. Peter Sykes, A Guidebook to Mechanism In Organic Chemistry
3. March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure

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# University of Science & Technology Meghalaya

## Department of Chemistry

Session: 2020-21(Even Semester)

Course: B.Sc. ....

Semester: 5th.....

Name of the Paper: Organic Chemistry-IV.....

Paper Code: BSC 501.....

Name of the Faculty: Dr. Sarifuddin Gazi.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-3	Lipids	12 theory 6 Tutorial	DoC-10/09/2021  DoE-14/01/2022	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-I U-3 (30%)  Test-II U-3 (40%)  Test-III U-3 (30%)	

### Suggested Books:

1. Berg, J.M., Tymoczko, J.L. and Stryer, L. (2006) Biochemistry. VIth Edition. W.H. Freeman and Co.

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# University of Science & Technology Meghalaya

## Department of Chemistry

Session: 2020-21(Even Semester)

Course: B.Sc. ....

Semester: 5th.....

Name of the Paper: Green Chemistry

Paper Code: BSC 505A.....

Name of the Faculty: Dr. Sarifuddin Gazi.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-3	<b>Examples of Green Synthesis/ Reactions</b>	12 theory 6 Tutorial	DoC-10/09/2021 DoE-10/12/2022	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-I U-3 (50%)  Test-II U-3 (50%)	
Unit-4	<b>Future Trends in Green Chemistry</b>	8 theory 3 Tutorial	DoC-14/12/2021 DoE-25/01/2021	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-III U-4 (50%)	

### Suggested Books:

1. V.K. Ahluwalia & M.R. Kidwai: New Trends in Green Chemistry, Anamalaya Publishers (2005).

2.

Approved by HoD

Signature of the Faculty

Verified by DUC



# University of Science & Technology Meghalaya

## Department of Chemistry

**Session: 2020-21(Even Semester)**

Course: M.Sc. ....

Semester: 3rd.....

Name of the Paper: Organic Chemistry III

Paper Code: MSC 302.....

Name of the Faculty: Dr. Sarifuddin Gazi.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-1	<b>Chemistry of Heterocyclic compounds</b>	12 Theory  3 Tutorial	DoC-11/10/2021  DoE-24/01/2022	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-I U-1 (30%)  Test-II U-1 (40%)  Test-III U-1 (30%)	

### Suggested Books:

1. Heterocyclic Chemistry 5th Edition by Joule, Mills & Smith

Approved by HOD

Signature of the Faculty



# University of Science & Technology Meghalaya

## Department of Chemistry

### Session: 2020-21(Even Semester)

Course: M.Sc. ....

Semester: 3rd.....

Name of the Paper: Applications of Spectroscopy

Paper Code: MSC 304.....

Name of the Faculty: Dr. Sarifuddin Gazi.....

### Details Plan

Unit	Topic	Targeted No. of classes	Tentative Schedule (DoC-DoE)	Tentative Pedagogy	Unit Allotted for Sessional Test	Remarks
Unit-2	<b>Mass Spectrometry</b>	10	DoC-16/10/2021  DoE-20/11/2021	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-I U-2 (50%)	
Unit-3	<b><math>^{13}\text{C}</math> NMR</b>	8	DoC-24/11/2021  DoE-18/12/2021	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-II U-2 (50%) & U-3 (50%)	
Unit-4	<b>Applications</b>	6	DoC-22/12/2021  DoE-22/01/2022	Constructive discussion & problem solving approach with 1. Chalk & Board 2. PPT	Test-III U-3 (50%) & U-4 (100%)	

### Suggested Books:

1. R. M. Silverstein, G. C. Basseler & T. C. Morill. *Spectroscopic Identification of Organic Compounds*, John Wiley 7th edn (2005).