



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Semester: I

Paper Name: Principles of Ecology

Paper Code: Z00-HC-1026

Learning Objectives:

1. Comprehend the economic importance of biodiversity and its role in the ecosystem.
2. Integrate knowledge from various sub-disciplines within ecology, such as population ecology, community ecology, ecosystem ecology, and conservation biology.
3. Understand the fundamentals of biodiversity conservation.
4. They will get idea about the impact of anthropogenic activities on the environment.
5. Appreciate the interdisciplinary nature of ecology and understand its connections to other scientific fields and societal issues.
6. Synthesize ecological knowledge to address complex ecological questions and challenges.
7. Apply ecological principles to real-world scenarios and case studies.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1&2	Unit 1: Introduction to Ecology /History of ecology, Autecology and synecology, Levels of organization	Books, E-Resources	Chalk & Black Board & ICT		
3 & 4	Laws of limiting factors				
5	Study of physical factors				
6					Unit Test
7	Unit3:Community/ Community characteristics: species richness,	Books, E-Resources	Chalk & Black Board & ICT		
8	Dominance				
9	Diversity, abundance,				
10	Vertical stratification				
11	Ecotone and edge effect				
12				Question-and-Answer Sessions	
13	Ecological succession with one example				
- 16	Theories pertaining to climax community				
17 & 18				Students' Seminar Presentation	
19	Unit 4:Ecosystem/ Types of ecosystems with one example in detail	Books, E-Resources	Chalk & Black Board & ICT		
20	Food chain: Detritus and grazing food chains				
21-23	Linear and Y-shaped food chains				

24 & 25	Food web, Energy flow through the ecosystem,			.	
26 & 27	Ecological pyramids				
28 & 29	Ecological efficiencies				
30 & 31				Explanation Sessions for dispel any doubts	
32					Unit Test
33	Nutrient and biogeochemical cycle with one example of Nitrogen cycle				
34				Catch-up class	
35	Human modified ecosystem				
36				Students' Seminar Presentation	
37 & 38				Tutorial session	
39					Unit Test

List of Engaging and Exploring with learning materials (Books) :

Sl. No	Title	Author	Publisher
1	Fundamentals of Ecology	E.P.Odum (2008)	Brooks/Cole. Indian Edition.
2	Ecology.	C.J.Krebs (2001)	Benjamin Cummings.
3	Ecology	R.E.Ricklefs (2000)	Chiron Press
4	Ecology	Ricklefs and Miller (2000)	Freeman and Co
5	Ecology- Principles and applications	Chapman and Reiss(1995)	Cambridge University Press

List of E-Resources: Enumerate the Electronic resources employed in my teaching plan for **Molecular biology** paper's are:

1. PubMed
2. ScienceDirect
3. SpringerLink
4. Wiley Online Library
5. JSTOR
6. Google Scholar
7. ResearchGate

Utilized approaches for fostering Experiential/
Participating Learning OR Interactive and Engaged learnings are

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

- (i) **Facilitating Active Participation:** Encouraging learners to actively engage with the material by asking questions and providing answers promotes a more dynamic learning experience.
- (ii) **Promoting Critical Thinking:** Q&A sessions stimulate critical thinking as learners analyze, evaluate, and respond to questions, fostering a deeper understanding of the subject matter.
- (iii) **Clarifying Concepts:** Addressing questions helps clarify any confusion or misunderstandings, ensuring that learners grasp key concepts more thoroughly.
- (iv) **Enhancing Retention:** Actively participating in Q&A sessions can enhance information retention as learners

actively process and recall information in response to questions

- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners' confidence in their knowledge and communication skills. Answering questions prompts learners to reflect on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

- (i) **Clarifying Misconceptions:** Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.
- (ii) **Ensuring Conceptual Understanding:** Explain complex concepts in a way that promotes a deep and thorough understanding among learners, helping them grasp the material more effectively.
- (iii) **Offering Additional Context:** Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.
- (iv) **Connecting to Real-world Examples:** Use real-world examples to illustrate abstract or theoretical concepts, making the content more relatable and aiding in practical application.
- (v) **Facilitating Peer Discussion:** Create an environment that encourages learners to discuss and share their doubts with peers, promoting collaborative problem-solving and learning from each other.

3. In explanation sessions for catch-up classes within interactive and engaged learning settings, the aims include:

(i) Addressing Missed Content: Explain topics and content that students may have missed during regular classes, ensuring they have a comprehensive understanding of the material.

(ii) Clarifying Previous Misunderstandings: Identify and address any misconceptions or misunderstandings that may have arisen when the students initially encountered the material.

(iii) Providing Review Opportunities: Offer a structured review of previously covered material to reinforce key concepts and help students solidify their understanding.

(iv) Tailoring Content to Individual Needs: Customize explanations based on individual student needs, addressing specific challenges or areas where students may require additional support.

(v) Monitoring Progress: Assess student comprehension during the catch-up session to ensure that gaps in understanding are being filled and that students are making progress in catching up with the rest of the class.

4. In explanation sessions for Students' Seminar Presentations within interactive and engaged learning settings, the aims include:

(i) Promoting Student Ownership: Encourage students to take ownership of their learning by researching and presenting a topic of interest, fostering a sense of responsibility and engagement.

(ii) Developing Research Skills: Provide an opportunity for students to develop research skills as they gather information, analyze sources, and present their findings in a coherent manner.

(iii) Enhancing Communication Skills: Improve students' oral communication skills by requiring them to articulate complex ideas, present information clearly, and respond to questions from their peers and instructors.

(iv) Cultivating Presentation Skills: Develop students' presentation skills, including effective use of visual aids, engaging delivery, and the ability to captivate an audience, contributing to their overall academic and professional growth.

- (v) **Building Confidence:** Boost students' confidence by providing them with opportunities to showcase their knowledge and skills in front of their peers, instructors, and potentially external audiences.

5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

- (i) **Clarifying Concepts:** Provide detailed explanations to clarify any complex or challenging concepts covered in the tutorial materials, ensuring that students have a thorough understanding.
- (ii) **Addressing Student Questions:** Encourage students to ask questions and actively participate in discussions to address any uncertainties or confusion they may have about the tutorial content.
- (iii) **Offering Additional Examples:** Provide supplementary examples and practical applications to reinforce key points and help students grasp the practical implications of the tutorial content.
- (iv) **Guiding Problem-Solving:** Assist students in solving problems related to the tutorial material, offering guidance and strategies to enhance their problem-solving skills.
- (v) **Providing Timely Feedback:** Offer constructive feedback on student performance during the tutorial session, guiding them on areas for improvement and recognizing their achievements, promoting a continuous learning cycle.

Question pattern framework for Unit Test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2.True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Semester: II

Paper Name: Cell Biology

Paper Code: ZOO-HC-2026

Learning Objectives:

1. This core course will make students able to understand how the different cell physically and chemically works as a unit of life.
2. Gain knowledge about the techniques and experiments that contributed to the understanding of molecular mechanisms of the cellular processes.
3. Be able to draw parallels between the physiological processes at the cellular and organismic levels.
4. Through this course, students will be able to appreciate the importance of various cell function and structures in the evolution of multi-cellular organisms.
5. The study will help the students to understand the new discoveries about the structure and internal functioning of the cell due to technological improvements.
6. Analyze and describe the regulation of essential cellular processes such as the cell cycle, mitosis, meiosis, and apoptosis.
7. Explore the molecular mechanisms involved in cell signaling and communication.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1 & 2	Unit 1: Over view of Cells/Prokaryotic and Eukaryotic cells	Books, E- Resources	Chalk & Black Board & ICT		
3	Virus, Viroids				
4	Mycoplasma, Prions				Home Assignment
5	Unit 6: Nucleus/Structure of Nucleus	Books, E- Resources	Chalk & Black Board & ICT		
6	Nuclear envelope				
7	Nuclear pore complex				
8				Catch-up class	
9	Nucleolus Chromatin				
10	Euchromatin and Hetrochromatin				
11	Packaging of DNA (nucleosome)				
12 & 13				Tutorial session	
14				Question-and-Answer Sessions	
15					Unit Test
16	Unit 7: Cell Division/ Mitosis	Books, E- Resources	Chalk & Black Board & ICT		
17 & 18	Meiosis				
19-22	Cell cycle and its regulation				
23 & 24				Students' Seminar Presentations	

25 & 26	Unit 8:Cell Signaling/ GPCR and Role of second messenger (cAMP)	Books, E- Resources	Chalk & Black Board & ICT		
27 & 28				Explanation Sessions for dispel any doubts	
29					Unit Test

List of Engaging and Exploring with learning materials (Books) :

Sl. No	Title	Author	Publisher
1	Cell and Molecular Biology: Concepts and Experiments	G. Karp (2010).	John Wiley and Sons.Inc.
2	The Cell: A Molecular Approach.	G.M.Cooper and R.E. Hausman (2009).	SM Press and Sunderland, Washington,D.C.; Sinauer Associates, MA
3	The World of the Cell.	W.M. Becker, L.J. Kleinsmith, J.Hardin. and G.P. Bertoni (2009).	Pearson Benjamin Cummings Publishing, SanFrancisco.
4	Molecular Biology of the Cell	Bruce Albert, Bray Dennis, Levis Julian, Raff Martin, Roberts Keith and Watson James (2008).	Garland publishing Inc., NewYork and London.
5	Molecular Biology of the Gene	J.D. Watson (2004)	Pearson

Question pattern framework for unit test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2.True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25

Utilized approaches for fostering Experiential/
Participating Learning OR Interactive and Engaged learning:

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

- (i) **Facilitating Active Participation:** Encouraging learners to actively engage with the material by asking questions and providing answers promotes a more dynamic learning experience.
- (ii) **Promoting Critical Thinking:** Q&A sessions stimulate critical thinking as learners analyze, evaluate, and respond to questions, fostering a deeper understanding of the subject matter.
- (iii) **Clarifying Concepts:** Addressing questions helps clarify any confusion or misunderstandings, ensuring that learners grasp key concepts more thoroughly.
- (iv) **Enhancing Retention:** Actively participating in Q&A sessions can enhance information retention as learners actively process and recall information in response to questions
- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners' confidence in their knowledge and communication skills. Answering questions prompts learners to reflect on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

- (i) Clarifying Misconceptions:** Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.
- (ii) Ensuring Conceptual Understanding:** Explain complex concepts in a way that promotes a deep and thorough understanding among learners, helping them grasp the material more effectively.
- (iii) Offering Additional Context:** Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.
- (iv) Connecting to Real-world Examples:** Use real-world examples to illustrate abstract or theoretical concepts, making the content more relatable and aiding in practical application.
- (v) Facilitating Peer Discussion:** Create an environment that encourages learners to discuss and share their doubts with peers, promoting collaborative problem-solving and learning from each other.

3. In explanation sessions for catch-up classes within interactive and engaged learning settings, the aims include:

- (i) Addressing Missed Content:** Explain topics and content that students may have missed during regular classes, ensuring they have a comprehensive understanding of the material.
- (ii) Clarifying Previous Misunderstandings:** Identify and address any misconceptions or misunderstandings that may have arisen when the students initially encountered the material.

(iii) Providing Review Opportunities: Offer a structured review of previously covered material to reinforce key concepts and help students solidify their understanding.

(iv) Tailoring Content to Individual Needs: Customize explanations based on individual student needs, addressing specific challenges or areas where students may require additional support.

(v) Monitoring Progress: Assess student comprehension during the catch-up session to ensure that gaps in understanding are being filled and that students are making progress in catching up with the rest of the class.

4. In explanation sessions for Students' Seminar Presentations within interactive and engaged learning settings, the aims include:

- (i) Promoting Student Ownership:** Encourage students to take ownership of their learning by researching and presenting a topic of interest, fostering a sense of responsibility and engagement.
- (ii) Developing Research Skills:** Provide an opportunity for students to develop research skills as they gather information, analyze sources, and present their findings in a coherent manner.
- (iii) Enhancing Communication Skills:** Improve students' oral communication skills by requiring them to articulate complex ideas, present information clearly, and respond to questions from their peers and instructors.
- (iv) Cultivating Presentation Skills:** Develop students' presentation skills, including effective use of visual aids, engaging delivery, and the ability to captivate an audience, contributing to their overall academic and professional growth.
- (v) Building Confidence:** Boost students' confidence by providing them with opportunities to showcase their knowledge and skills in front of their peers, instructors, and potentially external audiences.

5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

- (i) **Clarifying Concepts:** Provide detailed explanations to clarify any complex or challenging concepts covered in the tutorial materials, ensuring that students have a thorough understanding.
- (ii) **Addressing Student Questions:** Encourage students to ask questions and actively participate in discussions to address any uncertainties or confusion they may have about the tutorial content.
- (iii) **Offering Additional Examples:** Provide supplementary examples and practical applications to reinforce key points and help students grasp the practical implications of the tutorial content.
- (iv) **Guiding Problem-Solving:** Assist students in solving problems related to the tutorial material, offering guidance and strategies to enhance their problem-solving skills.
- (v) **Providing Timely Feedback:** Offer constructive feedback on student performance during the tutorial session, guiding them on areas for improvement and recognizing their achievements, promoting a continuous learning cycle.

Question pattern framework for Unit Test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2.True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Paper Name: Fundamentals of Biochemistry

Semester: III

Paper Code: Z00-HC-3036

Learning Objectives:

1. Students would gain general understanding of the major types of biochemical molecules, including small, large and super molecular components found in cells.
2. Students would be expert in basic to advance concepts of amino acids and proteins of cells.
3. Students would be expert to develop understanding of lipid at chemical, biochemical and molecular level.
4. Students will come in terms with complexities of nucleic acids and enzyme.
5. The basic structural and functional chemistry of biomolecules.
6. Kinetics of enzyme action and metabolism.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1-3	Unit 3:Proteins/Amino acids: Structure, Classification and General properties of α - amino acids; Physiological importance of essential and non-essential α - amino acids	Books, E-Resources	Chalk & Black Board & ICT		
4-7	Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Denaturation; Introduction to simple and conjugate proteins				
8					Unit Test & Home Assignment
9 &10	Immunoglobulins: Basic Structure, Classes and Function, Antigenic Determinants				
11	Unit 4:NucleicAcids/ Structure:Purines and pyrimidines,Nucleosides, Nucleotides,Nucleicacids	Books, E-Resources			
12				Question-and-Answer Sessions	
13	Cot Curves: Base pairing, Denaturation and Renaturation of DNA				
14	Types of DNA and RNA				
15	Complementarity of DNA, Hpyo- Hyperchromaticity of DNA				
16 & 17				Students' Seminar	

18	Unit 5: Enzymes/ Nomenclature and classification	Books, E- Resources	Chalk & Black Board & ICT		
19 - 20	Cofactors; Specificity of enzyme action; Isozymes				
21-23	Mechanism of enzyme action				
24-26	Enzyme kinetics				
27				Explanation Sessions for dispel any doubts	
28	Factors affecting rate of enzyme-catalyzed reactions				
29					Unit Test
30 & 31	Derivation of Michaelis- Menten equation, Concept of K_m and V_{max}	Books, E- Resources	Chalk & Black Board & ICT		
32-34	Lineweaver- Burk plot; Multi-substrate reactions				
35				Catch-up class	
36	Enzyme inhibition				
37	Allosteric enzymes and their kinetics				
38 & 39	Regulation of enzyme action				
& 41				Students' Seminar Presentation	
42-44				Tutorial session	
45					Unit Test

List of Engaging and Exploring with learning materials (Books) :

Sl. No	Title	Author	Publisher
1	Lehninger's Principles of Biochemistry	M.M. Cox and D.L. Nelson (2008)	W.H. Freeman and Co., New York
2	Biochemistry	J.M.Berg, J.L.Tymoczko.and L.Stryer (2007)	W.H. Freeman and Co., New York
3	Harper's Illustrated Biochemistry	R.K.Murray,D.A.Bender,K.M.Botham,P.J.Kennelly,V.W.Rodwe.and P.A.Well, (2009).	The McGraw- Hill CompaniesInc
4	Fundamental of Biochemistry	D. Voet and J. G. Voet (2013).	John Wiley and Sons New York.
5	Instant Notes in Biochemistry	B.D. Hames, and N.M. Hooper (2000).	BIOS Scientific Publishers Ltd.,U.K.

List of E-Resources: Enumerate the Electronic resources employed in my teaching plan for **Molecular biology** paper's are:

1. PubMed
2. ScienceDirect
3. SpringerLink
4. Wiley Online Library
5. JSTOR

6. Google Scholar

7. ResearchGate

Utilized approaches for fostering Experiential/
Participating Learning OR Interactive and Engaged learnings are:

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

- (i) **Facilitating Active Participation:** Encouraging learners to actively engage with the material by asking questions and providing answers promotes a more dynamic learning experience.
- (ii) **Promoting Critical Thinking:** Q&A sessions stimulate critical thinking as learners analyze, evaluate, and respond to questions, fostering a deeper understanding of the subject matter.
- (iii) **Clarifying Concepts:** Addressing questions helps clarify any confusion or misunderstandings, ensuring that learners grasp key concepts more thoroughly.
- (iv) **Enhancing Retention:** Actively participating in Q&A sessions can enhance information retention as learners actively process and recall information in response to questions
- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners'

confidence in their knowledge and communication skills. Answering questions prompts learners to reflect on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

(i) Clarifying Misconceptions: Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.

(ii) Ensuring Conceptual Understanding: Explain complex concepts in a way that promotes a deep and thorough understanding among learners, helping them grasp the material more effectively.

(iii) Offering Additional Context: Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.

(iv) Connecting to Real-world Examples: Use real-world examples to illustrate abstract or theoretical concepts, making the content more relatable and aiding in practical application.

(v) Facilitating Peer Discussion: Create an environment that encourages learners to discuss and share their doubts with peers, promoting collaborative problem-solving and learning from each other.

3. In explanation sessions for catch-up classes within interactive and engaged learning settings, the aims include:

(i) Addressing Missed Content: Explain topics and content that students may have missed during regular classes, ensuring they have a comprehensive understanding of the material.

(ii) Clarifying Previous Misunderstandings: Identify and address any misconceptions or misunderstandings that may

have arisen when the students initially encountered the material.

(iii) Providing Review Opportunities: Offer a structured review of previously covered material to reinforce key concepts and help students solidify their understanding.

(iv) Tailoring Content to Individual Needs: Customize explanations based on individual student needs, addressing specific challenges or areas where students may require additional support.

(v) Monitoring Progress: Assess student comprehension during the catch-up session to ensure that gaps in understanding are being filled and that students are making progress in catching up with the rest of the class.

4. In explanation sessions for Students' Seminar Presentations within interactive and engaged learning settings, the aims include:

- (i) Promoting Student Ownership:** Encourage students to take ownership of their learning by researching and presenting a topic of interest, fostering a sense of responsibility and engagement.
- (ii) Developing Research Skills:** Provide an opportunity for students to develop research skills as they gather information, analyze sources, and present their findings in a coherent manner.
- (iii) Enhancing Communication Skills:** Improve students' oral communication skills by requiring them to articulate complex ideas, present information clearly, and respond to questions from their peers and instructors.
- (iv) Cultivating Presentation Skills:** Develop students' presentation skills, including effective use of visual aids, engaging delivery, and the ability to captivate an audience, contributing to their overall academic and professional growth.
- (v) Building Confidence:** Boost students' confidence by providing them with opportunities to showcase their knowledge and skills in front of their peers, instructors, and potentially external audiences.

5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

- (i) **Clarifying Concepts:** Provide detailed explanations to clarify any complex or challenging concepts covered in the tutorial materials, ensuring that students have a thorough understanding.
- (ii) **Addressing Student Questions:** Encourage students to ask questions and actively participate in discussions to address any uncertainties or confusion they may have about the tutorial content.
- (iii) **Offering Additional Examples:** Provide supplementary examples and practical applications to reinforce key points and help students grasp the practical implications of the tutorial content.
- (iv) **Guiding Problem-Solving:** Assist students in solving problems related to the tutorial material, offering guidance and strategies to enhance their problem-solving skills.
- (v) **Providing Timely Feedback:** Offer constructive feedback on student performance during the tutorial session, guiding them on areas for improvement and recognizing their achievements, promoting a continuous learning cycle.

Question pattern framework for Unit Test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2.True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Semester: IV

Paper Name: Biochemistry of Metabolic Processes

Paper Code: Z00-HC-4036

Learning Objectives:

1. The basic structural and functional chemistry of biomolecules.
 2. The relationship of energetics with biological systems.
 3. Kinetics of enzyme action and metabolism.
- Students would be expertise in basic to advance concepts of amino acids and proteins of cells.
- 3 . Students would be expertise to develop understanding of lipid sat chemical, biochemical and molecular level.
 4. Students will come in terms with complexities of nucleic acids and enzyme.
 5. The basic structural and functional chemistry of biomolecules.
 6. Kinetics of enzyme action and metabolism.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1	Unit 1: Overview of Metabolism/Catabolism vs Anabolism	Books, E-Resources	Chalk & Black Board & ICT		
2	Stages of catabolism				
3 & 4	Compartmentalization of metabolic pathways				
5 & 6	Shuttle systems and membrane transporters				
7	ATP as "Energy Currency of cell"				
8					Unit Test & Home Assignment
9	Coupled reactions				
10 & 11	Use of reducing equivalents and cofactors				
12	Intermediary metabolism				
13 & 14				Question-and-Answer Sessions	
15	Regulatory mechanisms				
16 & 17	Unit 4:Protein Metabolism/Catabolism of amino acids	Books, E-Resources	Chalk & Black Board & ICT		
18	Transamination				
19 - 20	Deamination				
21 & 22				Catch-up class	
23 & 24	Urea cycle				
25 & 26	Fate of C-skeleton of Glucogenic and Ketogenic amino acids				

27 & 28				Students' Seminar Presentation	
29	Unit 5: Oxidative Phosphorylation/Redox systems	Books, E-Resources	Chalk & Black Board & ICT		
30	Review of mitochondrial respiratory chain				
31 & 32				Explanation Sessions for dispel any doubts	
33	Inhibitors and un-couplers of Electron Transport System				
34				Tutorial session	
35					Sessional Examination

List of Engaging and Exploring with learning materials (Books) :

Sl. No	Title	Author	Publisher
1	Lehninger's Principles of Biochemistry	M.M. Cox and D.L. Nelson (2008)	W.H. Freeman and Co., New York
2	Biochemistry	J.M.Berg, J.L.Tymoczko.and L.Stryer (2007)	W.H. Freeman and Co., New York
3	Harper's Illustrated Biochemistry	R.K.Murray,D.A.Bender,K.M.Botham,P.J.Kennelly,V.W.Rodwe.and P.A.Well, (2009).	The McGraw- Hill CompaniesInc
4	Fundamental of Biochemistry	D. Voet and J. G. Voet (2013).	John Wiley and Sons New York.
5	Instant Notes in Biochemistry	B.D. Hames, and N.M. Hooper (2000).	BIOS Scientific Publishers Ltd.,U.K.

List of E-Resources: Enumerate the Electronic resources employed in my teaching plan for **Molecular biology** paper's are:

1. PubMed
2. ScienceDirect
3. SpringerLink
4. Wiley Online Library
5. JSTOR
6. Google Scholar
7. ResearchGate

Utilized approaches for fostering Experiential/
Participating Learning OR Interactive and Engaged learnings are:

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

- (i) **Facilitating Active Participation:** Encouraging learners to actively engage with the material by asking questions and providing answers promotes a more dynamic learning experience.
- (ii) **Promoting Critical Thinking:** Q&A sessions stimulate critical thinking as learners analyze, evaluate, and respond to questions, fostering a deeper understanding of the subject matter.
- (iii) **Clarifying Concepts:** Addressing questions helps clarify any confusion or misunderstandings, ensuring that learners grasp key concepts more thoroughly.
- (iv) **Enhancing Retention:** Actively participating in Q&A sessions can enhance information retention as learners actively process and recall information in response to questions
- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners' confidence in their knowledge and communication skills. Answering questions prompts learners to reflect

on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

(i) Clarifying Misconceptions: Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.

(ii) Ensuring Conceptual Understanding: Explain complex concepts in a way that promotes a deep and thorough understanding among learners, helping them grasp the material more effectively.

(iii) Offering Additional Context: Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.

(iv) Connecting to Real-world Examples: Use real-world examples to illustrate abstract or theoretical concepts, making the content more relatable and aiding in practical application.

(v) Facilitating Peer Discussion: Create an environment that encourages learners to discuss and share their doubts with peers, promoting collaborative problem-solving and learning from each other.

3. In explanation sessions for catch-up classes within interactive and engaged learning settings, the aims include:

(i) Addressing Missed Content: Explain topics and content that students may have missed during regular classes, ensuring they have a comprehensive understanding of the material.

(ii) Clarifying Previous Misunderstandings: Identify and address any misconceptions or misunderstandings that may have arisen when the students initially encountered the material.

(iii) Providing Review Opportunities: Offer a structured review of previously covered material to reinforce key concepts and help students solidify their understanding.

(iv) Tailoring Content to Individual Needs: Customize explanations based on individual student needs, addressing specific challenges or areas where students may require additional support.

(v) Monitoring Progress: Assess student comprehension during the catch-up session to ensure that gaps in understanding are being filled and that students are making progress in catching up with the rest of the class.

4. In explanation sessions for Students' Seminar Presentations within interactive and engaged learning settings, the aims include:

- (i) Promoting Student Ownership:** Encourage students to take ownership of their learning by researching and presenting a topic of interest, fostering a sense of responsibility and engagement.
- (ii) Developing Research Skills:** Provide an opportunity for students to develop research skills as they gather information, analyze sources, and present their findings in a coherent manner.
- (iii) Enhancing Communication Skills:** Improve students' oral communication skills by requiring them to articulate complex ideas, present information clearly, and respond to questions from their peers and instructors.
- (iv) Cultivating Presentation Skills:** Develop students' presentation skills, including effective use of visual aids, engaging delivery, and the ability to captivate an audience, contributing to their overall academic and professional growth.
- (v) Building Confidence:** Boost students' confidence by providing them with opportunities to showcase their knowledge and skills in front of their peers, instructors, and potentially external audiences.

5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

- (i) **Clarifying Concepts:** Provide detailed explanations to clarify any complex or challenging concepts covered in the tutorial materials, ensuring that students have a thorough understanding.
- (ii) **Addressing Student Questions:** Encourage students to ask questions and actively participate in discussions to address any uncertainties or confusion they may have about the tutorial content.
- (iii) **Offering Additional Examples:** Provide supplementary examples and practical applications to reinforce key points and help students grasp the practical implications of the tutorial content.
- (iv) **Guiding Problem-Solving:** Assist students in solving problems related to the tutorial material, offering guidance and strategies to enhance their problem-solving skills.
- (v) **Providing Timely Feedback:** Offer constructive feedback on student performance during the tutorial session, guiding them on areas for improvement and recognizing their achievements, promoting a continuous learning cycle.

Question pattern framework for Unit Test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2. True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4. Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Paper Name: Molecular Biology

Semester: V (Honours)

Paper Code: Z00-HC-5016

Learning Objectives:

1. This paper is aimed to introduce molecular biology viz Amino acid, DNA and RNA.
2. To develop a knowledge of enzymes and mechanism of their action in various biological reactions.
3. To understand the process of gene expression & protein synthesis.
4. This course will teach about the complex organisation of the eukaryotic cell as well as the molecular mechanisms of the cellular processes found in all cell types.
5. Students would gain expertise in knowledge pool complex molecular mechanisms occurring in cell and the applications of molecular technologies for betterment of life.
6. This course will enhance opportunities of student in medicine and research technology, thus developing contextual knowledge
7. The study of biology stands as a tribute to human curiosity for seeking to discover at gene level.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1 & 2	Unit 1.NucleicAcids/ Salient features of DNA and RNA Watson and Crick model of DNA.	Books, E- Resources	Chalk & Black Board & ICT		
3 & 4	Unit 2: DNA Replication/ DNA Replication in prokaryotes and eukaryotes.	Books, E- Resources	Chalk & Black Board & ICT		
5-7	Mechanism of DNA replication, Semi- conservative, bidirectional and semi- discontinuous replication				
8					Unit Test & Home Assignment
9	RNA priming, Replication of circular and linear <i>ds</i> - DNA	Books, E- Resources			
				Question-and-Answer Sessions	
11	Replication of telomeres	Books, E- Resources			
12& 13				Students' Seminar Presentations	
14	Unit3:Transcription/ RNA polymerase and transcription Unit	Books, E- Resources	Chalk & Black Board & ICT		
15 & 16	Mechanism of transcription in				

	prokaryotes and eukaryotes				
17-18	Synthesis of rRNA and mRNA, transcription factors				
19				Explanation Sessions for dispel any doubts.	
20					Unit Test
21 & 22	Unit 4: Translation/ Genetic code, Degeneracy of the genetic code and Wobble Hypothesis.	Books, E-Resources	Chalk & Black Board & ICT		
23-25	Process of protein synthesis in prokaryotes: Ribosome structure and assembly in prokaryotes, fidelity of protein synthesis, aminoacyl tRNA synthetases and charging of tRNA; Proteins involved in initiation, elongation and termination of Polypeptide chain				
26				Catch-up class	
27	Inhibitors of protein synthesis				
28 & 29	Difference between prokaryotic and eukaryotic translation				
30				Students' Seminar Presentation	
31	Unit 5: Post Transcriptional Modifications and Processing of Eukaryotic RNA/ Structure of globin mRNA	Books, E-Resources	Chalk & Black Board & ICT		
32	Split genes: concept of introns and exons				
33-34	Splicing mechanism, alternative splicing, exon				

	shuffling, and RNA editing,				
35	Processing of tRNA				
36				Tutorial session	
37	Unit 8: Regulatory RNAs/ Ribo-switches	Books, E-Resources	Chalk & Black Board & ICT		
38	RNA interference				
39	miRNA & siRNA				
40				Students' Seminar Presentation	
41					Sessional Examination

List of Engaging and Exploring with learning materials (Books) :

Sl. No.	Title	Author	Publisher
1	Molecular Biology	A.McLennan., A.Bates, P.Turner and M. White.(2015).	Taylor and Francis Group, NewYork and London
2	Molecular Biotechnology Principles and Applications of Recombinant DNA.	B.R.Glick and J.J.Pasternak (2009).	ASM press, Washington, USA
3	The World of the Cell.	W.M. Becker., J.L.Kleinsmith., J.Hardin and G.P. Bertoni (2009)	Pearson Benjamin Cummings Publishing, San Francisco.
4	Molecular Biology of the Cell	Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter (2002)	Garland Science
5	The Cell: A Molecular Approach	G.M. Cooper, E. Robert and R.E. Hausman (2005)	ASM Press and Sinauer Associates

6	Cell and Molecular Biology: Concepts and Experiments	G. Karp (2010)	John Wiley and Sons.Inc.
7	Gene XI	B. Lewin (2008)	Jones and Bartlett

List of E-Resources: Enumerate the Electronic resources employed in my teaching plan for **Molecular biology** paper's are:

1. PubMed
2. ScienceDirect
3. SpringerLink
4. Wiley Online Library
5. JSTOR
6. Google Scholar
7. ResearchGate

Utilized approaches for fostering Experiential/

Participating Learning OR Interactive and Engaged learnings are:

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

- (i) **Facilitating Active Participation:** Encouraging learners to actively engage with the material by asking questions and providing answers promotes a more dynamic learning experience.
- (ii) **Promoting Critical Thinking:** Q&A sessions stimulate critical thinking as learners analyze, evaluate, and respond to questions, fostering a deeper understanding of the subject matter.
- (iii) **Clarifying Concepts:** Addressing questions helps clarify any confusion or misunderstandings, ensuring that learners grasp key concepts more thoroughly.
- (iv) **Enhancing Retention:** Actively participating in Q&A sessions can enhance information retention as learners actively process and recall information in response to questions
- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners' confidence in their knowledge and communication skills. Answering questions prompts learners to reflect on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

(i) Clarifying Misconceptions: Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.

(ii) Ensuring Conceptual Understanding: Explain complex concepts in a way that promotes a deep and thorough understanding among learners, helping them grasp the material more effectively.

(iii) Offering Additional Context: Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.

(iv) Connecting to Real-world Examples: Use real-world examples to illustrate abstract or theoretical concepts, making the content more relatable and aiding in practical application.

(v) Facilitating Peer Discussion: Create an environment that encourages learners to discuss and share their doubts with peers, promoting collaborative problem-solving and learning from each other.

3. In explanation sessions for catch-up classes within interactive and engaged learning settings, the aims include:

(i) Addressing Missed Content: Explain topics and content that students may have missed during regular classes, ensuring they have a comprehensive understanding of the material.

(ii) Clarifying Previous Misunderstandings: Identify and address any misconceptions or misunderstandings that may have arisen when the students initially encountered the material.

(iii) Providing Review Opportunities: Offer a structured review of previously covered material to reinforce key concepts and help students solidify their understanding.

(iv) Tailoring Content to Individual Needs: Customize explanations based on individual student needs, addressing

specific challenges or areas where students may require additional support.

(v) **Monitoring Progress:** Assess student comprehension during the catch-up session to ensure that gaps in understanding are being filled and that students are making progress in catching up with the rest of the class.

4. In explanation sessions for Students' Seminar Presentations within interactive and engaged learning settings, the aims include:

- (i) **Promoting Student Ownership:** Encourage students to take ownership of their learning by researching and presenting a topic of interest, fostering a sense of responsibility and engagement.
- (ii) **Developing Research Skills:** Provide an opportunity for students to develop research skills as they gather information, analyze sources, and present their findings in a coherent manner.
- (iii) **Enhancing Communication Skills:** Improve students' oral communication skills by requiring them to articulate complex ideas, present information clearly, and respond to questions from their peers and instructors.
- (iv) **Cultivating Presentation Skills:** Develop students' presentation skills, including effective use of visual aids, engaging delivery, and the ability to captivate an audience, contributing to their overall academic and professional growth.
- (v) **Building Confidence:** Boost students' confidence by providing them with opportunities to showcase their knowledge and skills in front of their peers, instructors, and potentially external audiences.

5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

- (i) **Clarifying Concepts:** Provide detailed explanations to clarify any complex or challenging concepts covered in the tutorial materials, ensuring that students have a thorough understanding.
- (ii) **Addressing Student Questions:** Encourage students to ask questions and actively participate in discussions to

address any uncertainties or confusion they may have about the tutorial content.

- (iii) **Offering Additional Examples:** Provide supplementary examples and practical applications to reinforce key points and help students grasp the practical implications of the tutorial content.
- (iv) **Guiding Problem-Solving:** Assist students in solving problems related to the tutorial material, offering guidance and strategies to enhance their problem-solving skills.
- (v) **Providing Timely Feedback:** Offer constructive feedback on student performance during the tutorial session, guiding them on areas for improvement and recognizing their achievements, promoting a continuous learning cycle.

Question pattern framework for Unit test:

Question pattern	Marks
1. Multiple Choice Questions (MCQs)	1X3= 3
2.True/False Questions	1X2=2
3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25



Nalbari College, Nalbari

Teaching Plan for the Session: 2022-2023

Name of the Teacher: Dr. Bidyut Kumar Das

Department: Zoology

Paper Name: Developmental Biology

Semester: VI

Paper Code: Z00-HC-6016

Learning Objectives:

1. Based on learning contents of embryology, students can have a systematic and organized learning about the knowledge and concepts of growth and development and their vital connection.
2. Developmental biology displays a rich array of material and conceptual practices that can be analyzed to better understand the scientific reasoning exhibited in experimental life sciences.
- 3 . To understand biological processes that take place in between cells organisms in nature.
4. Developing new ideas and innovation to understand the basis of life.
5. Developmental Biology enquires about the fundamental processes that underpin the fertilization of an egg cell and its step-by-step transformation into the fascinating complexity of a whole organism.

Sl no. (Lectures)	Topic/Subtopic	Learning Resources	Mode of Teaching & ICT Tools	Experiential/ Participating Learning Used	Mode of Assessment for CIE
1 & 2	Unit1:Introduction/Histo rical perspective and basic concepts	Books, E- Resources	Chalk & Black Board & ICT		
3 & 4	Phases of development				Home Assignment
5 - 7	Cell-Cell interaction				
8 & 9	Pattern formation				
10 & 11	Differentiation and growth				
12				Question-and-Answer Sessions	
13 & 14	Differential gene expression				
15& 16	Cytoplasmic determinants				
17	Asymmetric cell division				
18				Catch-up class	
19					Unit Test
20	Unit 4: Post Embryonic Development/ Metamorphosis: Changes	Books, E- Resources	Chalk & Black Board & ICT		
21 & 22	Hormonal regulations in amphibians				
23 & 24	Hormonal regulations in insects				
25				Explanation Sessions for dispel any doubts	
26	Regeneration				
27 & 28	Modes of regeneration				
29	Epimorphosis				
30	Morphallaxis				
31 & 32	Compensatory regeneration				

33 & 34				Students' Seminar Presentation	
35-37	Ageing: Concepts and Theories				
38 & 39				Tutorial session	
40					Sessional Examination

List of Engaging and Exploring with learning materials (Books) :

Sl. No.	Title	Author	Publisher
1	Developmental Biology	Gilbert, S. F. (2010).	Sinauer Associates, Inc., Publishers, Sunderland, Massachusetts, USA
2	An Introduction to Embryology,	Balinsky B. I. and Fabian B. C. (1981).	International Thompson Computer Press
3	Analysis of Biological Development	Kalthoff (2008).	McGraw-Hill Publishers
4	Principles of Development	Lewis Wolpert (2002)	Oxford University Press
5	Genetic Analysis of Animal Development	Wilkins A. S., (1993)	Wiley-Liss
	Handbook of Stem Cells	R. Lanza, I. Weissman, J. Thomson, and R. Pedersen (2012)	Elsevier Academic press.

List of E-Resources: Enumerate the Electronic resources employed in my teaching plan for **Developmental biology** paper's are:

1. PubMed
2. ScienceDirect
3. SpringerLink

4. Wiley Online Library
5. JSTOR
6. Google Scholar
7. ResearchGate

Utilized approaches for fostering Experiential/
Participating Learning OR Interactive and Engaged learnings are:

1. Question-and-Answer Sessions.
2. Explanation Sessions for dispel any doubts.
3. Catch-up class.
4. Students' Seminar Presentation and
5. Tutorial session

1. In question-and-answer sessions for interactive and engaged learning, the aims include:

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- (v) **Building Confidence:** Answering questions in a supportive environment helps build learners' confidence in their knowledge and communication skills. Answering questions prompts learners to reflect on what they've learned, reinforcing the integration of new information into their existing knowledge base.

2. In explanation sessions aimed at dispelling doubts for interactive and engaged learning, the goals include:

- (i) **Clarifying Misconceptions:** Provide clear and concise explanations to address any misconceptions or misunderstandings that learners may have regarding the content.
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- (iii) **Offering Additional Context:** Provide additional context or background information to enhance comprehension and give learners a more comprehensive understanding of the subject matter.
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5. In explanation sessions for Tutorial Sessions within interactive and engaged learning settings, the aims include:

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3. Short Answer Questions	1X2=2
4.Fill in the Blank	1x2=2
5. Critical Thinking Questions	3x2=6
6. Essay Questions	5X2=10
TOTAL MARKS	25

Academic Calendar: 2023-2024

Nalbari College, Nalbari

(Up to December 2023)



Sl. No	Month/ Year	Dates	Working Day / Class Day / Examination Day / Holiday	No. of Holidays	No of Working Days	No of Teaching Days	Target Academic and other activities
1.	July	01-31	Summer Vacation	31			Celebration of foundation day of Nalbari College on 4 th of July
		4	Foundation Day of College				
		01-23					Completion of admission process for all HS & undergraduate programmes (HS 1 st Year & UG 1 st semester)
2.	August	2-5, 7-12, 14, 16-17, 19, 21-26, 28-31	Working Days / Class Days	6	24	24	<p>Completion of admission process for all postgraduate programmes (PG 1st semester)</p> <p>PNC memorial debate competition and Prof. Kandarpa Kalita memorial quiz competition during 2nd and 4th week of August</p> <p>Commencement of PG 1st semester classes from 3rd week of August</p>
		1	Commencement of New Academic Session and Even Semester Classes				
		6, 13, 20, 27	Sunday				
		15	Independence Day				
		18	Holiday (Tithi of Srimanta Sankardev)				

3.	September	1-2, 5, 7-9, 11-16, 18-23, 26-30	Working Days / Class Days	7	23	22	<p>Freshmen Social during 1st week of September</p> <p>Commencement of Odd Semester's 1st sessional during 2nd week of September</p>
		3, 10, 17, 24	Sunday				
		4	Holiday (Tithi of Sri Sri Madhabdeva)				
		6	Holiday (Janmastomi)				
		25	Holiday (Janmotsav of Srimanta Sankardeva)				
4.	October	3-7, 9-14, 16-17, 19	Working Days / Class Days	15	16	14	<p>NCSU election & counting on 16th and 17th October</p>
		1, 8, 15, 22, 29	Sunday				
		2	Holiday (Birthday of Mahatma Gandhi)				
		18	Holiday (Kati Bihu)				
		20 - 28	Holiday (Durga Puja / Lakshmi Puja)				
5.	November	1-4, 6-11, 14, 16-18, 20-23, 25, 28-30	Working days / Class Days	8	22	22	<p>Odd semester 2nd sessional examination During 2nd week of November</p> <p>Conduct of examination for UG Courses (odd semester) as per GU notification</p>
		5, 12, 19, 26	Sunday				
		12, 13	Holiday (Kali Puja & Dipawali)				
		15	Holiday (Bhatri Dwitiya)				
		19	Holiday (Chhat Puja)				
		24	Holiday (Lachit Divas)				
		27	Holiday (Guru Nanak's Birthday)				

6.	December	1, 4-9, 11-16, 18-23	Working Days, Class Days	7	24	<p>Odd semester final examination for PG courses as per GU notification and HS 2nd Year preparatory examination</p> <p>HS 1st year classes to be continued</p> <p>Winter break starts from last week of December</p>
		3, 10, 17, 24, 31	Sunday			
		2	Holiday (Asom Divas / Su-Ka-Pha Divas)			
		25	Holiday (Christmas Day)			
		26-31	Tentative time for Winter Break			