ECONOMICS DEPARTMENT

SYNOD COLLEGE

TEACHING METHODS

The following are the different teaching methods adopted by the department:

1. Name of the method: LECTURE METHOD

DEFINATION

The main method of teaching in the department is teacher-centered where most of the classes are done by lecture method. The teacher prepared lectures for the classes concerned and the lectures are delivered to the students for a period of 45 minutes. The students are required to take notes of what is taught in the class and absorbed it. After the conclusion of the topic the students asked questions related to the topic.

OBJECTIVES

- 1. To deliver the topic of the syllabus
- 2. To make students understand the subject concerned
- 3. To increase their cognitive ability

WHEN TO USE IT

It is used by demonstrating on a whiteboard, visual aid

However, lecture method is done in two ways:

- a. Blackboard teaching. This method is done when the topics of the syllabus to be taught involves calculations as in mathematics, statistics or topics which requires diagrammatic representation.
- b. PowerPoint teaching. It is one of the teaching methods frequently used in the department. It is a visual learning process whereby students learn by watching the teachings and demonstration. The students are able to grasp the learning process through the writings, images displayed through PowerPoint.

IMPLEMENTATION

The method is carried out by the teacher as it is teacher based learning technique. The teachers prepare their topics in accordance with the syllabus and disseminate the information to the students. The students collect the information and analysis it further. Through this method the students are taught the various lessons from the teachers by using video clips, drawing of flowcharts to explain development models, diagrams.

2. Name of the teaching method. Tutorials

DEFINITION

It can be defined as a teaching method to help either individually or in groups as an addition to the lecture method in the classroom.

OBJECTIVES

- 1. To give the extra help to students in addition to classroom teaching.
- 2. It helps a one-to-one correspondence with the students who need extra help.

WHEN TO USE IT

IN the classroom after the regular classes a follow up to the lecture done or completed. It is used by demonstrating on the whiteboard however by making students engage by integrating the tutorials with the experiences of the course as a whole.

IMPLEMENTATION

The method is carried out as a student centered and to make student engaged in the lessons by giving them works, make the students participate by allowing them to analyse the problems and put forward questions to be discussed.

3. Name of the teaching method. Textbook Assignments

DEFINITION

It is defined as instructional work given by the teacher to the students to evaluate their progress and it is one of the common methods adopted in the teaching process.

OBJECTIVES

- 1. To help the students to initiate their learning skills.
- 2. To make self-reliable in finding out information.

WHEN TO USE

The method is done by giving lessons to students in relation with the curriculum and the topic discussed in the classroom. The assignment given should be specific and the sources should be reliable. The method can be used as a regular exercise to help students strengthen their knowledge not just by listening but by work assignments related to the topic.

Refrences:

- 1. Centre for Teaching Excellence TA Manual
- 2. Race, P, Brown, S. (1998). *The Lecturer's Toolkit. A practical guide to teaching, learning, and assessment.* London, UK: Kogan Page Limited.
- 3. Byllie D'Amato Andrews and Robert J. Quin (2004). First-Year Teaching Assignments: A Descriptive Analysis, JSTOR

1.1.1. **Effective Curriculum Delivery** (Qualitative Metric)

The following methods are used by the department to enhance the teaching-learning process

- i. Description of teaching method used by the departments
 - (a) **Lecture Method:** This method was used in the classroom to impart knowledge to the students on the given syllabus. Its help the students the given topic through explanation.
 - (b) **Discussion Method:** Discussion methods are a variety of forums for open-ended, clearing the doubts, collaborative exchange of ideas among a teacher and students or among students for the purpose of furthering students thinking, learning, problem solving, understanding, or literary appreciation. Here, both the teacher and students have an interactive session.
 - (c) **Student's Seminar:** Student's Seminars are for **small groups of students studying the same course**. The students were divided into a different groups and topics was to given each group. Seminars are designed for students to talk about topics in the course reading or lectures in detail, so students have to take an active part in the debate.
 - (d) **Power-Point Presentation:** Power-Point presentation is a presentation created on software from Microsoft that allows users to add audio, visual and audio/visual features to a presentation. Power-point presentation it depicts the content clearly and its help the students to understand through videos, pictures, audio and animation.
 - (e) Brainstorming: A group problem-solving technique that involves the spontaneous contribution of ideas from all members of the group conducted several brainstorming sessions also: the mulling over of ideas by one or more individuals in an attempt to devise or find a solution to a problem.
 - (f) **Storytelling:** Storytelling is the description of ideas, beliefs, personal experiences, and life- lessons through stories or narratives that evoke powerful emotions and insights. Its help students to think about local problems and develop critical thinking skills, creative skills to write stories, or interact to tell stories. It also enhances attention, concentration, listening skills and develops patience and endurance.
 - **(g) Demonstration:** Demonstration is a teaching method based predominantly on the modelling of knowledge and skills. A form of presentation whereby the teacher or learners show how something works or operates, or how something is done.
 - **(h) Poster presentation:** A poster presentation is an effective way to demonstrate knowledge and skills at the end of a lesson or unit.

- (i) Constructivism Approach: Constructivism is an important learning theory that educators use to help their students learn. Constructivism is based on the idea that people actively construct or make their own knowledge, and that reality is determined by your experiences as a learner. Basically, learners use their previous knowledge as a foundation and build on it with new things that they learn.
- ii. Distribution of the Course content amongst the teachers of the departments in the last five years
 - (a) Dr I. Lapang
 - (b) Mrs V.G. Wahlang
 - (c) Dr E. B. Majaw
 - (d) Dr. R. Lapasam
 - (e) Dr. B. Sungoh
 - (f) Shri K. K. Sohkhlet
 - (g) Mrs P.C. Tariang

	Division of Syllabus								
			Year 2017-2019	9					
Name of the 1st Semester 2nd Semester 3rd Semester Semester 5th Semester 6th Semester									
Dr. I. Lapang	Paper I: Educational	Paper II- Foundations of	Paper III- Educational	Paper IV- Educational	Paper V - Educational	Paper VII: Educational			
	Psychology	Education	System in India	Thought and	Evaluation and	Technology			
	Unit- II:	Unit IV- Education,	Unit II- Education in	Practices	Statistics	Unit II-			
	Intelligence and	Social Change and	Colonial India	Unit II-	Unit I- Introductory	Communication			
	Creativity	Modernization	(1813-1882)	Educational	Concepts	- Concept and			
	- Creativity:	- Education as an	- Charter Act (1813)	Thoughts - Indian	- Concept of	Process of			
	Concept and	Instrument of	- Macaulay's Minute	- Rabindranath	Measurement and	Communication			
	Nature,	Social Change	(1835)	Tagore	Evaluation	- Types of			
	Characteristics of	- Education and	- Wood's	- Aurobindo Ghosh	- Distinction	Classroom			
	a Creative Person,	Modernization	Despatch(1854)	- Swami	Between	Communication			
	Promoting	- Effects of Social	- Hunter's	Vivekananda	Measurement and	- Education			
	Creativity	Changes on	Commission (1882)	Unit V-	Evaluation	through Mass-			
	Through Educatio	Education		Educational	- Process and	Media (Radio,			
	n		Unit IV- Education	Practices	Purpose of	Television and			

	Unit - IV: Learning - Learning: Meaning and Nature - Factors Influencing Learning - Theories of Learning: Trail and Error, Classical Conditioning and Insightful Learning - Transfer of Learning		in North East India- (With special reference to Meghalaya) - Problems and Issues of Higher Education	- Dewey's Project Method	Evaluation - Bloom's Taxonomy of Educational Objectives under Cognitive Domain Unit VI- Correlation and NPC - Concept and Types of Correlation - Spearman's Rank Difference Method of Correlation - Normal Probability Curve: Concept and Characteristics Paper VI - Contemporary Indian Education Unit I - Pre-School Education - Types of Pre- Primary Schools - Anganwadi's Balwad is, Creches' Day Care Centres Unit VI - Current Trends - Human Rights Education - Women Empowerment through Education	Press) - ICT in Education Paper VIII: School Management Unit II- Classroom MAnagement - Meaning of Classroom MAnagement - Principles of Classroom Management - Process of Classroom Management (Planning, Organising, Leadinding and Controlling) - Techniques of Classroom Management UNIT IV: School Inspections & Supervision - Objectives and Functions of Supervision - Steps of School Supervision
Smt. V.G.Wahlang	Paper I : Educational Psychology Unit II:	Paper II- Foundations of Education Unit II:	Paper III- Educational System in India Unit IV: Education	Paper IV- Educational Thought and Practices	Paper V - Educational Evaluation and Statistics	Paper VII: Educational Technology Unit III: Teaching

Intelligence and	Philosophies of	in Post-	Unit-I: Ancient	Unit-II Test	Technology
Creativity	Education	Independence India	Educational	Characteristics	-Teaching Aids:
-Intelligence :	-Idealism	-Education in the	Thought	-Classification of	Types & uses
Concept and	-Naturalism	Indian Constitution	-Educational	Tests	Unit IV: Teaching
Nature Nature	-Pragmatism	-University	Thought &	-Concept of	Concepts
-Role of Heredity	Tugmunsin	Education	Practices in Post	Standardized	-Teaching:
& Environment	-Components of	Commission (1948-	Vedic Period with	&Teacher Made Test	Concept, Function
in Determining	Education and their	49)	reference to	-Characteristics of a	and Principles
Intelligence	Mutual	-Secondary	Upanishads	good Test	-Characteristics of
-Theories of	Relationship	Education	- Educational	- Reliability and	Effective Teaching
intelligence (Two	(Pupils, Teachers,	Commission (1952-	Thought &	Method of	-Teaching
factor & Multiple	School and	1953)	Practices in	Determining	Operations at
Intelligence)	Curriculum	-Indian Education	Ancient Greece	Reliability by the	various stages (Pre-
Unit III:	Transaction)	Commission (1964-	- Educational	Test- Retest method	Active, Interactive
Personality &	1101100001011)	66) with Reference	Thought &	-Validity and	and Post-Active)
Individual		to School Education	Practices in	Method of	
Differences		-Knowledge	Ancient Rome	Determining Content	Paper VIII:
-Meaning and		Commission Report		Validity	School
Nature of		(2007) with	Unit-VI:	Unit-IV Graphical	Management
Personality		Reference to School	Innovation	Representation of	Unit-I School
-Type and Trait		Education	Practices in	Grouped Data	Management
Approaches to		- Right to Education	Education	-Histogram	-Concept & Scope
Personality		Act (2009)	-Inclusive	-Frequency Polygon	of School
-Factors		,	Education	-Cumulative	organization and
Influencing				Frequency Curve	Management
Personality				-Ogive	- Types of School
Development				Paper VI -	Management:
-Measurement of				Contemporary	Centralized and
Personality				Indian Education	Decentralized,
-Individual					Authoritarian &
Indifferences: It				Unit IV: Higher	Democratic
Educational				Education	-Objectives and
Significance				-Quality	Principles of
				&Excellence in	School
				Higher Education	Management
				-Role of UGC,	-Characteristics of
				NAAC and AICTE	Successful School
				-Knowledge	management

					Commission Report 2007 with reference to higher education -Globalization of Higher Education	Unit VI Institional Programmes & Planning -Programmes of a School - Evaluation of
						School Programme
Dr E. B. Majaw	Paper I:	Paper II-	Paper III-	Paper IV-	Paper V -	Paper VII:
	Educational	Foundations of	Educational	Educational	Educational	Educational
	Psychology	Education	System in India	Thought and	Evaluation and	Technology
	Unit – I:	Unit – IV:	Unit – I:	Practices	Statistics	Unit – I
	Introducti	Introduction	Education in	Unit - III:	Unit – V	Introductor
	on to	to Sociology	Ancient and	Educational	Central	y Concept
	Education	&	Medieval	Thought –	Tendency	1. Concept
	al	Education	India Basic	Western	&	and Scope
	Psycholog	1. Nature	Ideas,	1. John	Dispersion	of
	y	&	Objectives,	Comenius	1. Measures	Educational
	1.	Scope of	Curriculum,	2. Jean	of Central	Technology
	Concept,	Educational	Methods of	Jacques	Tendency:	2. Types of
	Need	Sociology	Teaching	Rousseau	Mean	Educational
	&	2. Education	& Role	3. Bertrand	Median	Technology
	Scope of	as a Social	of Teachers	Russell	& Mode	Unit - VI
	Education	Process	of the	Unit – V:	2. Measures	Skills of
	al	3. Need for	following	Educational	of	Teaching
	Psycholog	Sociological	Systems: -	Practices	Dispersion:	&
	y	Approach to	1. Education	1. Froebel's	Range,	Micro-
	2.	Education	in Ancient	Kindergarte	Quartile	teaching
	Methods	4. School as	India: Vedic,	n	Deviation,	1. Skills of
	of	a Social	Brahmanic	2. Montessori	Average	Teaching
	Education	Sub-system	&	Method	Deviation,	2. Micro-
	al	Unit – VI	Buddhistic		and Standard	teaching
	Psycholog	Education,	Education –		Deviation	3. Team
	y	Society, and	2. Education			Teaching
	(Introspect	Culture	in Medieval		Paper VI -	4. Evaluation of
	ion,	1. Social	India		Contemporary	Teaching.
	Observati	Group:	Unit V:		Indian Education	
	on, Case	Primary	National		Unit II:	Paper VIII:
	study)	&	Policy of		Elementary	School

3.	Secondary	Education	Education	Management
Applicatio	2. Social Interaction	(1986)	1. Sarva	Unit – III
n of	&	&	Shiksha	Physical
Education	Socialization	Programme	Abhiyan	Infrastructu
al		of Action	(SSA):	re of School
Psycholog		(POA, 1992)	Programme	1. School
y in		1. Concept	for	Building
Teaching		of National	Universalisat	and design
and		System of	ion of	of school
Learning.		Education	Elementary	plant
4. Stages		2. Primary	Education	2. School
of Growth		Education:	2. Role of	Library
&		Recommend	Block	3. School
Developm		ations	Resource	laboratory
ent		&	Centres	4. School
5.		Programme	(BRC),	office
Adolescen		of Action	Cluster	UNIT IV: School
t		3. Secondary	Resource	Inspections &
Behaviour		Education:	Centres	Supervision
		Recommend	(CRC), and	-Meaning, need
Characteri		ations	Village	and scope of
stics,		&	Education	Inspection and
Problems		Programme	Committees	Supervision
&		of Action	(VEC)	- Distinctions
Role of		4. Higher Education:	3. Literacy	between Inspection
Education		Recommendations	Mission	and Supervision
Unit – VI:		& Programme	Unit VI:	
Counsellin		of Action	Current	
g			Trends	
1. Steps and			Concept,	
Techniques of			Need, Scope,	
counseling			and	
			Programmes	
			of the	
			following: -	
			1. Population	
			Education	
			2. Environmental	

					Education	
Dr. R Lapasam	Paper I:	Paper II-	Paper III-	Paper IV-	Paper V -	Paper VII:
_	Educational	Foundations of	Educational	Educational	Educational	Educational
	Psychology	Education	System in India	Thought and	Evaluation and	Technology
	UNIT 5:	UNIT 1:	UNIT 3: Education	Practices	Statistics	UNIT 3: Teaching
	Guidance	Introduction to	in Colonial India	UNIT 4: Modern	UNIT 3:	Technology.
	-	Philosophy &	(1902 - 1947).	Educational	Psychological Test.	- Programme
	Guidance:Meanin	Education	- Indian University	Thought.	- Likert's Attitude	Instruction.
	g, Nature, Scope	- Education &	Commission	- Radha Krishna.	Scale.	- Computer Aided
	&Types.	Philosophy:	(1902).	- J.	- Cattel's Sixteen	Instruction.
	- Need &	Concept and their	- Sadler's	Krishnamurthy.	Personality Factors	UNIT 5: Teaching
	Important of	Relationship.	Commission	- Paulo Freire.	(16 PF).	Methods.
	Educational &	- Aims of	(1917).	UNIT 6: Innovative	- Stanford Binet	- Methods of
	Vocational	Education:	- Hartog	Practices in	Test of Intelligence.	Teaching: Lecture,
	Guidance Service	Individual &	Committee (1929).	Education	Paper VI -	Demonstration,
	in Schools.	Social.	- Sargent Report	- Distance	Contemporary	Problem solving
	- Aptitudes,	- Objectives of	(1944).	Education.	Indian Education	and Discussion.
	Interest and	Education at	UNIT 6 : Education	- Non formal and	UNIT 3 :Secondary	- Levels of
	Attitudes,	Different Levels.	in North East India	Continuing	Education.	Teaching:
	Educational	- Role of	(With special	Education.	- Rashtriya	Memory,
	Achievements	Education in the	reference to	- Inclusive	Madhyamik	Understanding and
	and Personality	Development of	meghalaya).	Education.	Shiksha(RMSA).	Reflective level.
	Traits.	Human Values	- Problems &		 Vocationalization 	- Teacher
		(Social, Moral and	Issues of Primary		of Secondary	Behavior
	UNIT 6	Aesthetic).	Education.		Education.	:Authoritarian,
	:Counselling		- Problems &		- Role of NCERT,	Democratic and
	- Steps &	UNIT	Issues of Secondary		CABE and	Laisse
	Techniques of	3:Democracy,	Education.		MBOSE.	
	Counselling.	Freedom &			- Navodaya	Paper VIII:
		Discipline.			Vidhyalaya's	School
		- Education &			:Objectives and	Management
		Democracy.			Quality Concerns.	UNIT 4
		- Freedom &			UNIT 5 : Teacher	:Functioning of
		Discipline in			Education	School.
		Education.			- Concept Need and	- Function of a
					Scope of Teacher	School.
					Education.	- School Time
					- Pre-service and	Table & Calendar.

					In-service Teacher Education. Programmes Role of DIET, CTE, DERT and NCTE in Teacher Education Duties and Responsibilities of a Teacher.	- Teacher's Diary Role of Headmaster & Teachers Staff Meeting. UNIT VI :Institutional Programmes & Planning - Institutional Planning - concept, need, objectives, principles and processOrganization of co-curricular activities
			Year 2020-22			
Name of the Teachers	1st Semester	2 nd Semester	3 rd Semester	4 th Semester	5 th Semester	6 th Semester
Smt.	Paper I:	Paper II-	Paper III-	Paper IV-	Paper V -	Paper VII:
V.G.Wahlang	Educational	Foundations of	Educational	Educational	Educational	Educational
	Psychology	Education	System in India	Thought and	Evaluation and	Technology
	Unit- II:	Unit IV- Education,	Unit II- Education in Colonial India	Practices Unit II-	Statistics Unit I Introductory	Unit II- Communication
	Intelligence and Creativity	Social Change and Modernization	(1813-1882)	Educational	Unit I- Introductory Concepts	- Concept and
	- Creativity:	- Education as an	- Charter Act (1813)	Thoughts - Indian	- Concept of	Process of
	Concept and	Instrument of	- Macaulay's Minute	- Rabindranath	Measurement and	Communication
	Nature,	Social Change	(1835)	Tagore	Evaluation	- Types of
	Characteristics of	- Education and	- Wood's	- Aurobindo Ghosh	- Distinction	Classroom
	a Creative Person,	Modernization	Despatch(1854)	- Swami	Between	Communication
	Promoting	- Effects of Social	- Hunter's	Vivekananda	Measurement and	- Education
	Creativity	Changes on	Commission (1882)	Unit V-	Evaluation	through Mass-
	Through Educatio	Education		Educational	- Process and	Media (Radio,
	n		Unit IV- Education	Practices	Purpose of	Television and

	Unit - IV: Learning - Learning:		in North East India- (With special reference to	- Dewey's Project Method	Evaluation - Bloom's Taxonomy of Educational	Press) - ICT in Education Paper VIII:
	Meaning and Nature - Factors Influencing Learning - Theories of Learning: Trail and Error, Classical Conditioning and Insightful Learning - Transfer of Learning		Meghalaya) - Problems and Issues of Higher Education		Objectives under Cognitive Domain Unit VI- Correlation and NPC - Concept and Types of Correlation - Spearman's Rank Difference Method of Correlation - Normal Probability Curve: Concept and Characteristics Paper VI - Contemporary	School Management Unit II- Classroom MAnagement - Meaning of Classroom MAnagement - Principles of Classroom Management - Process of Classroom Management - Process of Classroom Management (Planning,
					Indian Education Unit I - Pre-School Education - Types of Pre- Primary Schools - Anganwadi's Balwad is, Creches' Day Care Centres Unit VI - Current Trends - Human Rights Education - Women	Organising, Leadinding and Controlling) - Techniques of Classroom Management UNIT IV: School Inspections & Supervision -Objectives and Functions of Supervision - Steps of School
Dr. B.Sungoh	Paper I : Educational Psychology Unit II:	Paper II- Foundations of Education Unit II:	Paper III- Educational System in India Unit IV: Education	Paper IV- Educational Thought and Practices	Empowerment through Education Paper V - Educational Evaluation and Statistics	Paper VII: Educational Technology Unit III: Teaching

	Intelligence and	Philosophies of	in Post-	Unit-I: Ancient	Unit-II Test	Technology
	Creativity	Education	Independence India	Educational	Characteristics	-Teaching Aids:
	-Intelligence:	-Idealism	-Education in the	Thought	-Classification of	Types & uses
	Concept and	-Naturalism	Indian Constitution	-Educational	Tests	Unit IV: Teaching
	Nature	-Pragmatism	-University	Thought &	-Concept of	Concepts
	-Role of Heredity		Education	Practices in Post	Standardized	-Teaching:
	& Environment	-Components of	Commission (1948-	Vedic Period with	&Teacher Made Test	Concept, Function
	in Determining	Education and their	49)	reference to	-Characteristics of a	and Principles
	Intelligence	Mutual	-Secondary	Upanishads	good Test	-Characteristics of
	-Theories of	Relationship	Education	- Educational	- Reliability and	Effective Teaching
	intelligence (Two	(Pupils, Teachers,	Commission (1952-	Thought &	Method of	-Teaching
	factor & Multiple	School and	1953)	Practices in	Determining	Operations at
	Intelligence)	Curriculum	-Indian Education	Ancient Greece	Reliability by the	various stages (Pre-
	Unit III:	Transaction)	Commission (1964-	- Educational	Test- Retest method	Active, Interactive
	Personality &		66) with Reference	Thought &	-Validity and	and Post-Active)
	Individual		to School Education	Practices in	Method of	
	Differences		-Knowledge	Ancient Rome	Determining Content	Paper VIII:
	-Meaning and		Commission Report		Validity	School
	Nature of		(2007) with	Unit-VI:	Unit-IV Graphical	Management
	Personality		Reference to School	Innovation	Representation of	Unit-I School
	-Type and Trait		Education	Practices in	Grouped Data	Management
	Approaches to		- Right to Education	Education	-Histogram	-Concept & Scope
	Personality		Act (2009)	-Inclusive	-Frequency Polygon	of School
	-Factors			Education	-Cumulative	organization and
	Influencing				Frequency Curve	Management
	Personality				-Ogive	- Types of School
	Development				Paper VI -	Management:
	-Measurement of				Contemporary	Centralized and
	Personality				Indian Education	Decentralized,
	-Individual					Authoritarian &
	Indifferences: It				Unit IV: Higher	Democratic
	Educational				Education	-Objectives and
	Significance				-Quality	Principles of
					&Excellence in	School
					Higher Education	Management
					-Role of UGC,	-Characteristics of
					NAAC and AICTE	Successful School
					-Knowledge	management
I.					5	

Shri.K.K.Sohkhl	Donon I.	Paper II-	Paper III-	Paper IV-	Commission Report 2007 with reference to higher education -Globalization of Higher Education	Unit VI Institional Programmes & Planning -Programmes of a School - Evaluation of School Programme Paper VII:
	Paper I : Educational	Foundations of	Educational	Educational	Educational	Educational
et	Psychology	Education Education	System in India	Thought and	Evaluation and	Technology
	Unit – I:	Unit – IV:	Unit – I:	Practices	Statistics	Unit – I
	Introducti	Introduction	Education in	Unit - III:	Unit – V	Introductor
	on to	to Sociology	Ancient and	Educational	Central	y Concept
	Education	&	Medieval	Thought –	Tendency	1. Concept
	al	Education	India Basic	Western	&	and Scope
	Psycholog	1. Nature	Ideas,	1. John	Dispersion	of
	y	&	Objectives,	Comenius	1. Measures	Educational
	1.	Scope of	Curriculum,	2. Jean	of Central	Technology
	Concept,	Educational	Methods of	Jacques	Tendency:	2. Types of
	Need	Sociology	Teaching	Rousseau	Mean	Educational
	&	2. Education	& Role	3. Bertrand	Median	Technology
	Scope of	as a Social	of Teachers	Russell	& Mode	Unit - VI
	Education	Process	of the	Unit – V:	2. Measures	Skills of
	al	3. Need for	following	Educational	of	Teaching
	Psycholog	Sociological	Systems: -	Practices	Dispersion:	&
	y	Approach to	1. Education	1. Froebel's	Range,	Micro-
	2.	Education	in Ancient	Kindergarte	Quartile	teaching
	Methods	4. School as	India: Vedic,	n	Deviation,	1. Skills of
	of	a Social	Brahmanic	2. Montessori	Average	Teaching
	Education	Sub-system	&	Method	Deviation,	2. Micro-
	al	Unit – VI	Buddhistic		and Standard	teaching
	Psycholog	Education,	Education –		Deviation	3. Team
	y	Society, and	2. Education			Teaching
	(Introspect	Culture	in Medieval		Paper VI -	4. Evaluation of
	ion,	1. Social	India		Contemporary	Teaching.
	Observati	Group:	Unit V:		Indian Education	
	on, Case	Primary	National		Unit II:	Paper VIII:
	study)	&	Policy of		Elementary	School

3.	Secondary	Education	Education	Management
Applicatio	2. Social Interaction	(1986)	1. Sarva	Unit – III
n of	&	&	Shiksha	Physical
Education	Socialization	Programme	Abhiyan	Infrastructu
al		of Action	(SSA):	re of School
Psycholog		(POA, 1992)	Programme	1. School
y in		1. Concept	for	Building
Teaching		of National	Universalisat	and design
and		System of	ion of	of school
Learning.		Education	Elementary	plant
4. Stages		2. Primary	Education	2. School
of Growth		Education:	2. Role of	Library
&		Recommend	Block	3. School
Developm		ations	Resource	laboratory
ent		&	Centres	4. School
5.		Programme	(BRC),	office
Adolescen		of Action	Cluster	UNIT IV: School
t		3. Secondary	Resource	Inspections &
Behaviour		Education:	Centres	Supervision
		Recommend	(CRC), and	-Meaning, need
Characteri		ations	Village	and scope of
stics,		&	Education	Inspection and
Problems		Programme	Committees	Supervision
&		of Action	(VEC)	- Distinctions
Role of		4. Higher Education:	3. Literacy	between Inspection
Education		Recommendations	Mission	and Supervision
Unit – VI:		& Programme	Unit VI:	
Counsellin		of Action	Current	
g			Trends	
1. Steps and			Concept,	
Techniques of			Need, Scope,	
counseling			and	
			Programmes	
			of the	
			following: -	
			1. Population	
			Education	
			2. Environmental	

					Education	
Smt. P.C.	Paper I:	Paper II-	Paper III-	Paper IV-	Paper V -	Paper VII:
Tariang	Educational	Foundations of	Educational	Educational	Educational	Educational
	Psychology	Education	System in India	Thought and	Evaluation and	Technology
	UNIT 5:	UNIT 1:	UNIT 3: Education	Practices	Statistics	UNIT 3: Teaching
	Guidance	Introduction to	in Colonial India	UNIT 4: Modern	UNIT 3:	Technology.
	-	Philosophy &	(1902 - 1947).	Educational	Psychological Test.	- Programme
	Guidance:Meanin	Education	- Indian University	Thought.	- Likert's Attitude	Instruction.
	g, Nature, Scope	- Education &	Commission	- Radha Krishna.	Scale.	- Computer Aided
	&Types.	Philosophy:	(1902).	- J.	- Cattel's Sixteen	Instruction.
	- Need &	Concept and their	- Sadler's	Krishnamurthy.	Personality Factors	UNIT 5: Teaching
	Important of	Relationship.	Commission	- Paulo Freire.	(16 PF).	Methods.
	Educational &	- Aims of	(1917).	UNIT 6: Innovative	- Stanford Binet	- Methods of
	Vocational	Education:	- Hartog	Practices in	Test of Intelligence.	Teaching: Lecture,
	Guidance Service	Individual &	Committee (1929).	Education	Paper VI -	Demonstration,
	in Schools.	Social.	- Sargent Report	- Distance	Contemporary	Problem solving
	- Aptitudes,	- Objectives of	(1944).	Education.	Indian Education	and Discussion.
	Interest and	Education at	UNIT 6 : Education	- Non formal and	UNIT 3 :Secondary	- Levels of
	Attitudes,	Different Levels.	in North East India	Continuing	Education.	Teaching:
	Educational	- Role of	(With special	Education.	- Rashtriya	Memory,
	Achievements	Education in the	reference to	- Inclusive	Madhyamik	Understanding and
	and Personality	Development of	meghalaya).	Education.	Shiksha(RMSA).	Reflective level.
	Traits.	Human Values	- Problems &		- Vocationalization	- Teacher
		(Social, Moral and	Issues of Primary		of Secondary	Behavior
	UNIT 6	Aesthetic).	Education.		Education.	:Authoritarian,
	:Counselling		- Problems &		- Role of NCERT,	Democratic and
	- Steps &	UNIT	Issues of Secondary		CABE and	Laisse
	Techniques of	3:Democracy,	Education.		MBOSE.	
	Counselling.	Freedom &			- Navodaya	Paper VIII:
		Discipline.			Vidhyalaya's	School
		- Education &			:Objectives and	Management
		Democracy.			Quality Concerns.	UNIT 4
		- Freedom &			UNIT 5 : Teacher	:Functioning of
		Discipline in			Education	School.
I						

Education.	- Concept Need and Scope of Teacher Education Pre-service and In-service Teacher Education. Programmes Role of DIET, CTE, DERT and NCTE in Teacher Education Duties and Responsibilities of a Teacher.	- Function of a School School Time Table & Calendar Teacher's Diary - Role of Headmaster & Teachers Staff Meeting. UNIT VI :Institutional Programmes & Planning - Institutional Planning - concept need, objectives, principles and processOrganization of co-curricular activities
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d of Departme artment of Educal Synod College, Shillong



Teaching Methods used by the Department

The English Department uses a variety of approaches and methods to ensure that the students receive the best that the institution has to offer.

It is generally known that the study of English literature allows the development of a student's knowledge of literary history, theory and criticism; it enhances his/her understanding of a wide range of cultures and intellectual traditions; it expands the student's horizon; it builds vocabulary, improves writing and reading skills and teaches critical thinking. Keeping in mind the aim and the focus of English Literature as a subject of study as well as the classroom demography and learning differences, the Department tries to utilize a combination of direct instruction and student-centered approaches and a blend of online and off-line learning models.

When a teacher begins a topic, she/he generally adopts the <u>Direct Method</u> where new ideas, concepts, backgrounds, vocabulary are explained with the help of visual aids or demonstrations. The teacher also tries to create learning environments that are <u>interactive and use collaborative learning strategies</u> such as prompting discussion-starters. The aim is to familiarize and immerse the learner in the topic of study. Students are then encouraged to read texts for:

- i. Plot and Comprehension
- ii. Theme
- iii. Understanding a particular author's craft and style
- iv. Literary theories on which the work is based on to learn to look at a work from different angles and viewpoints.

Many literary works encourage critical thinking due to the issues and themes they explore. A learner can learn to think critically about the events and characters in a work, the themes it presents, the author's purpose in writing it, and the ways it fits into a certain time period. A learner can analyze its impact on society and the ways it compares and contrasts with other texts or other forms of its representation. As such, the teachers supplement the teaching of texts with images, audios, films or videos. Like close reading of text, close viewing of video or close listening to audios ensures that students become critical viewers as well as readers/listeners of texts. Focus on the visual and auditory experience enhances the overall understanding and appreciation of a literary work.

The teachers of the Department also design and allow the students to participate in <u>task-based learning activities</u> to help them in the learning process. These include activities such as group discussions, role playing, quizzes, presentations, writing summaries and critical analyses. Such activities promote the learners' verbal and writing skills and enhance their interest in the subject and their participation and confidence.

With the onset of the pandemic, the Department has also integrated the use of technology to facilitate the teaching-learning process. The Department has created email groups, shares information through WhatsApp and utilises web-based tools such as Zoom and Google Meet to have live video conferencing platforms with the students. The Department has created Google Classrooms for every class and the students are afforded a space to receive notes as well as share any feedback that they need to give. Google Classroom also affords the teachers the ability to send files and audio recordings to the students so that they can utilise the notes as well as listen to the critical analysis provided to them through the recordings in an asynchronous manner.

Head

Repartment of English

Department of English

Synod College

TOPIC ALLOCATION 2017

1st Semester Hons +EE (Paper1)

SDK--- Sonnet 60 and The Relic (H+EE)

IP-Elegy written in a Country Churchyard (H+EE)

SK-To His Coy mistress and The World (H+EE)

GL-Epistle to Miss Blount (H) the Friend + Epistle

BI- Lycidas (H+EE) and Che Franc(EE) + Lycidas

MD-The Friar and Spenser's Sonnet 79 (H) and Epistle-to-Miss Blount and Sonnet 79 (LEE)

3rd Semester Hons and Elective English (Paper3)

SDK- John Webster: The Duchess of Malfi (H=EE)

IP-John Osborne: Look Back in Anger (H+EE)

SK- Christopher Marlowe: The Jew of Malta (H+EE)

GL- Bernard Shaw: Saint Joan (H+EE)

BI- William Congreve: Love for Love (H) and EE class to be shared

MD-Shakespeare: Twelfth Night (H+EE) + Love for Love

5th Semester Hons (Paper 5 and 6)

SDK- Poems- Wordsworth, Coleridge, Shelley, Keats, Arnold, Dylan Thomas.

IP- Browning: A grammarians Funeral + George Eliot: Silas Marner

SK- Tennyson: The Lady of Shallott + Conrad: Lord Jim

GL- Auden: Spain1937+ Hardy: The Mayor of Casterbridge

BI- Yeats: Sailing to Byzantium+ Woolf: To the Lighthouse

MD- Eliot: The Love song of Prufrock + Lawrence: Sons and Lovers

5th Semester Gen. English Gr A (Paper2)

IP- Function of Education+ A Pilgrimage to Tawang + Grammar

SK- What is Courage + Shooting an Elephant+ Grammar

GL- Vanishing Animals+ The First Atom Bomb+ Grammar

MD- Charles Dickens: David Copperfield

5th Semester Gen. English Gr B (Paper2)

SDK-Function of Education+ A Pilgrimage to Tawang + Grammar

SK- What is Courage + Shooting an Elephant+ Grammar

GL- Vanishing Animals+ The First Atom Bomb+ Grammar

BI- Charles Dickens: David Copperfield

B.SC General English

MD-Swami and Friends

SK-The Bishop's Candlesticks + Grammar

SDK-The Ghost of Jerry Bundler +Grammar

B.Com General English

IP-Biography of J.R.D.Tata +Robert Frost Stopping by Woods on a snowy Evening+ Part A Section

Gl- Herman Wouk-A Talk on advertising + Dylan Thomas Do not go Gentle into that Good Night + Part C Section 11

BI- Ruskin Bond: Life at my own Pace +Wislawa Szymborska-View from a Grain of Sand + Part B

Head

Head Department of English

Synod College

TOPIC ALLOCATION 2018

1st Semester Hons +EE (Paper1)

SDK--- Sonnet 60 and The Relic (H+EE)

IP—Elegy written in a Country Churchyard (H+EE)

SK-To His Coy mistress and The World (H+EE)

GL-Epistle to Miss Blount (H) and Epistle to Miss Blount and The Friar (EE)

BI— Lycidas (H) and Lycidas and Spenser's sonnet79 (EE)

MD-The Friar and Spenser's Sonnet 79 (H)

3rd Semester Hons and Elective English (Paper3)

SDK- John Webster: The Duchess of Malfi (H=EE)

IP-John Osborne: Look Back in Anger (H+EE)

SK- Christopher Marlowe: The Jew of Malta (H+EE)

GL- Bernard Shaw: Saint Joan (H+EE)

BI- William Congreve: Love for Love (H)

MD-Shakespeare: Twelfth Night (H) and Twelfth Night and Love for Love (EE)

5th Semester Hons (Paper 5 and 6)

SDK- Poems- Wordsworth, Coleridge, Shelley, Keats, Arnold.

IP- Browning: A grammarians Funeral + George Eliot: Silas Marner

SK-Tennyson: The Lady of Shallott + Conrad: Lord Jim

GL- Auden: Spain1937+ Hardy: The Mayor of Casterbridge

BI- Yeats: Sailing to Byzantium+ Dylan Thomas +Woolf: To the Lighthouse

MD- Eliot: The Love song of Prufrock + Lawrence: Sons and Lovers

5th Semester Gen. English Gr A (Paper2)

IP- Function of Education+ A Pilgrimage to Tawang + Grammar

SK- What is Courage + Shooting an Elephant+ Grammar

GL- Vanishing Animals+ The First Atom Bomb+ Grammar

MD- Charles Dickens: David Copperfield

5th Semester Gen. English Gr B (Paper2)

SDK- Function of Education+ A Pilgrimage to Tawang + Grammar

SK- What is Courage + Shooting an Elephant+ Grammar

GL- Vanishing Animals+ The First Atom Bomb+ Grammar

BI- Charles Dickens: David Copperfield

Head Department of English Synod College

Topic allocation 2012-2018

2nd Semester Hons +EE Fiction (Paper11)

IP-Charles Dickens- Hard Times (H+EE)

SK-Daniel Defoe-Moll Flanders (H +EE)

SDK--- Emily Bronte-Wuthering Heights (EE)

MD—Emily Bronte-Wuthering Heights (H)

GL-Jane Austen-Mansfield Park (H+EE)

BI-Mary Shelley -Frankenstein (H+EE)

4th Semester Hons Language and History of English Literature (Paper 1V)

MD-The Middle Ages: The Beginnings of Poetry and Drama+16th century: University Wits, Shakespeare, Ben Jonson.

SDK-16th C: Elizabethan Age characteristics, Elizabethan Poetry, Spenser, Sydney+ Metaphysical Poetry,

BI- 17th C: Milton, Jacobean drama, Decline of Drama+ Critical Terminology.

GL-18th C: Rise of the Novel+ Phonetic Transcription.

IP- 19th C: Romantic Movement, 19th C Fiction.

SK-20th C: Modernist Poetry, Modernism in the Novel.

4th Semester Alty Com

MD- The Bet A Canary for One + Grammar

GL- Lawley Road+ Sweetest Love I Do Not Go+ Grammar

SK- Lalajee+ On His Blindness + Grammar

BI- Journey of the Magi, Dover Beach, Solitary Reaper.

4th Semester Alty Arts

IP- The Boy Comes Home

SDK- An Astrologer's Day, London, Anthem for Doomed Youth

SK- The Duchess & the Jeweller, A Sketch, Prayer Before Birth.

BI- The Romance of a Busy Broker+ Essay writing and Business Correspondence

4th Semester Gen, English Gr A

MD- Poems- Sweetest love I do not go, An Essay on Man, Youth and Age, Three years she grew in Sun and shower, She walks in beauty.

IP- Poems- Ozymandias, Ulysses, Channel firing, Journey of the Magi, Prayer for my daughter.

SK- The Monkey's Paw, Pound on Demand+ On His Blindness.

GL- Shaw: Arms and the Man

4th Semester Gen, English Gr B

MD- Poems- Sweetest love I do not go, An Essay on Man, Youth and Age, Three years she grew in Sun and shower, She walks in beauty.

SDK- Poems- Ozymandias, Ulysses, Channel firing, Journey of the Magi, Prayer for my daughter

SK-The Monkey's Paw, Pound on Demand+ On His Blindness

BI- Shaw:Arms and the Man

6th Semester- Literary criticism (Paper V11)

MD- Aristotle "On Tragedy" from Poetics

BI- Dryden Selection from "Essay of Dramatick Poesie" (Ancient versus Modern)

SK- Matthew Arnold "Function of Criticism"

SDK- Wordsworth "Preface to the Lyrical Ballads"

IP- T.S.Eliot "Tradition and Individual Talent"

GL - Rhetoric and Prosody

6th Semester -Indian Writing in English (Paper V111)

GL-R.K.Narayan : Bachelor of Arts + (Poems) Eunice D'Souza, A.K.Ramanujan

BI- Mulk Raj: Anand Coolie

IP- Anita Desai : Fire on the Mountain

SDK- Vikram Seth: From Heaven Lake

SK-Amitava Ghosh: The Shadow Lines

MD- (Poems) Jayanta Mahapatra + Nissim Ezekiel + Kamala Das

Topic allocation 2020

2nd Semester Hons + EE Fiction

IP - Charles Dickens - Hard Times (H+EE)

PL - Daniel Defoe - Moll Flanders (H+EE)

SDK - Emily Bronte - Wuthering Heights (EE)

MD - Emily Bronte - Wuthering Heights (H)

GL - Jane Austen - Mansfield Park (H+EE)

BI - Mary Shelley - Frankenstein (H+EE)

4th Semester Hons Language and History of English Literature (Paper IV)

MD – The Middle Ages: The Beginning of Poetry and Drama + 16th century: University Wits, Shakespeare, Ben Jonson

SDK – 16th Century: Elizabethan Age characteristics, Elizabethan Poetry, Spenser, Sydney + Metaphysical Poetry

BI - 17th Century: Milton, Jacobean Drama, Decline of Drama + Critical Terminology

GL - 18th Century: Rise of the Novel + Phonetic Transcription

IP - 19th Century: Romantic Movement, 19th C Fiction

PL - 20th Century: Modernist Poetry, Modernism in the Novel

4th Semester Alty Com

MD- The Bet + A Canary for One + Grammar

GL - Lawley Road + Sweetest Love I Do Not Go + Grammar

PL - Lalajee + On His Blindness + Grammar

BI - Journey of the Magi, Dover Beach, Solitary Reaper

4th Semester Alty Arts

MD – The Boy Comes Home

SDK - An Astrologer's Day, London. Anthem for Doomed Youth

PL - The Duchess & the Jeweller, A Sketch, Prayer Before Birth

BI - The Romance of a Busy Broker + Essay Writing and Business Correspondence

4th Semester Compulsory English Gr A

MD – Poems – Sweetest Love I Do Not Go, An Essay on Man, Youth and Age, Three Years She Grew in Sun and Shower, She Walks in Beauty

IP - Poems - Ozymandias, Ulysses, Channel Firing, Journey of the Magi, Prayer for my Daughter

PL – The Money's Paw, Pound on Demand and Poem – On His Blindness

GL - Shaw: Arms and the Man

4th Semester Compulsory English Gr B

MD – Poems – Sweetest Love I Do Not Go, An Essay on Man, Youth and Age, Three Years She Grew in Sun and Shower, She Walks in Beauty

SDK – Poems – Ozymandias, Ulysses, Channel Firing, Journey of the Magi, Prayer for my Daughter

PL – The Money's Paw, Pound on Demand and Poem – On His Blindness

BI- Shaw: Arms and the Man

6th Semester Hons - Literary criticism (Paper V11)

MD - Aristotle "On Tragedy" from Poetics

PL - Dryden Selection from "Essay of Dramatick Poesie" (Ancient versus Modern)

IP - Matthew Arnold "Function of Criticism"

SDK- Worsworth "Preface to the Lyrical Ballads"

BI - T.S. Elliot "Tradition and Individual Talent"

GL - Rhetoric and Prosody

6th Semester Hons - Indian Writing in English (Paper V111)

GL - R.K. Narayan: Bachelor of Arts + (Poems) Eunice D'Souza, A.K. Ramanujan

BI - Mulk Raj Anand: Coolie

IP - Anita Desai: Fire in the Mountain

SDK - Vikram Seth: From Heaven Lake

PL - Amitava Ghosh: The Shadow Lines

MD - (Poems) Javanta Mahapatra + Nissim Ezekiel + Kamala Das

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Topic allocation 2021

2nd Semester Hons + EE Fiction

AM - Charles Dickens - Hard Times (H+EE)

PL - Daniel Defoe - Moll Flanders (H+EE)

MD - Emily Bronte - Wuthering Heights (H+EE)

LN - Jane Austen - Mansfield Park (H+EE)

BI - Mary Shelley - Frankenstein (H+EE)

4th Semester Hons Language and History of English Literature

MD – The Middle Ages: The Beginning of Poetry and Drama + 16th century: University Wits, Shakespeare,

Ben Jonson

Am – 16th Century: Elizabethan Age characteristics, Elizabethan Poetry, Spenser, Sydney + Metaphysical

Poetry

BI – 17th Century: Milton, Jacobean Drama, Decline of Drama + Critical Terminology

LN - 18th Century: Rise of the Novel + Phonetic Transcription

IP - 19th Century: Romantic Movement. 19th C Fiction

PL - 20th Century: Modernist Poetry, Modernism in the Novel

6th Semester Hons - Literary criticism (Paper V11)

MD - Aristotle "On Tragedy" from Poetics

PL – Dryden Selection from "Essay of Dramatick Poesie" (Ancient versus Modern)

AM - Matthew Arnold "Function of Criticism"

IP - Worsworth "Preface to the Lyrical Ballads"

BI - T.S. Elliot "Tradition and Individual Talent"

LN - Rhetoric and Prosody

6* Semester Hons - Indian Writing in English (Paper V111)

LN - R.K. Narayan: Bachelor of Arts + (Poems) Eunice D'Souza, A.K. Ramanujan

BI - Mulk Raj Anand: Coolie

IP – Anita Desai: Fire in the Mountain

AM – Vikram Seth: From Heaven Lake PL – Amitava Ghosh: The Shadow Lines

MD – (Poems) Jayanta Mahapatra + Nissim Ezekiel + Kamala Das

4th Semester Alty Com

IP - The Bet + A Canary for One + Grammar

Lawley Road + Sweetest Love I Do Not Go + Grammar

LN – Lalajee + On His Blindness + Grammar

Journey of the Magi, Dover Beach, Solitary Reaper

4th Semester Alty Arts

AM - The Boy Comes Home

An Astrologer's Day, London. Anthem for Doomed Youth

PL - The Duchess & the Jeweller, A Sketch, Prayer Before Birth

The Romance of a Busy Broker + Essay Writing and Business Correspondence

4th Semester Compulsory English Gr A. B. C

MD – Poems – Sweetest Love I Do Not Go, An Essay on Man, Youth and Age, Three Years She Grew in Sun and Shower, She Walks in Beauty

IP - Poems - Ozymandias, Ulysses, Channel Firing, Journey of the Magi, Prayer for my Daughter

PL – The Money's Paw, Pound on Demand and Poem – On His Blindness

BI - Shaw: Arms and the Man

Head

Department English

Topic allocation 2022

2nd Semester Hons + EE Fiction

IP - Charles Dickens - Hard Times (H+EE)

MD - Daniel Defoe - Moll Flanders (H+EE)

MD - Emily Bronte - Wuthering Heights (H+EE)

BI - Jane Austen - Mansfield Park (H+EE)

BI - Mary Shelley - Frankenstein (H+EE)

4th Semester Hons Language and History of English Literature

LN – The Middle Ages: The Beginning of Poetry and Drama + 16th century: University Wits, Shakespeare, Ben Jonson

EP – 16th Century: Elizabethan Age characteristics, Elizabethan Poetry, Spenser, Sydney + Metaphysical Poetry

EP - 17th Century: Milton, Jacobean Drama, Decline of Drama + Critical Terminology

LN - 18th Century: Rise of the Novel + Phonetic Transcription

PL - 19th Century: Romantic Movement. 19th C Fiction

PL - 20th Century: Modernist Poetry, Modernism in the Novel

6th Semester Hons – Literary criticism (Paper V11)

PL – Aristotle "On Tragedy" from Poetics

PL - Dryden Selection from "Essay of Dramatick Poesie" (Ancient versus Modern)

EP - Matthew Arnold "Function of Criticism"

EP - Worsworth "Preface to the Lyrical Ballads"

LN - T.S. Elliot "Tradition and Individual Talent"

LN - Rhetoric and Prosody

6th Semester Hons - Indian Writing in English (Paper V111)

MD - R.K. Narayan: Bachelor of Arts + Amitava Ghosh: The Shadow Lines + Kamala Das

BI – Mulk Raj Anand: Coolie + Vikram Seth: From Heaven Lake + Jayanta Mahapatra

IP - Anita Desai: Fire in the Mountain + Nissim Ezekiel + A.K. Ramanujan + Eunice D'Souza

4th Semester B Com Compulsory English

IP - Biography of J.R.D Tata + Stopping by Woods on a Snowy Evening + Section II Part A

BI - Life at My Own Pace + View from a Grain of Sand + Section II Part B

MD - A talk on Advertising + Do not Go Gentle into that Good night + Section II Part C

4th Semester Alty Arts

MD – The Boy Comes Home + Essay Writing

IP - An Astrologer's Day + The Romance of A Busy Broker + The Duchess & the Jeweller

BI - London + A Sketch + Anthem for Doomed Youth + Prayer Before Birth + Business Correspondence

4th Semester Compulsory English Gr A, B, C

LN – Poems – Sweetest Love I Do Not Go, An Essay on Man, Youth and Age, Three Years She Grew in Sun and Shower, She Walks in Beauty

IP - Poems - Ozymandias, Ulysses, Channel Firing, Journey of the Magi, Prayer for my Daughter

PL – The Monkey's Paw, Pound on Demand and Poem – On His Blindness

EP - Shaw: Arms and the Man

Head

Department of English

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Teaching methods-2017-2019

The teaching methods which are regularly practiced are as follows:-

- a) Lectures, explanation, group discussions, departmental and inter-departmental seminars.
- b) Illustration and demonstration with the help of chalk and blackboard/ white board, tools such as maps, charts, models, tools and equipment, power point presentations, videos etc.
- c) Outdoor actual hand on demonstration and exercises during field works, surveys, extension programmes and study tours/excursions.
- d) Students are exposed and taught of the various cartographic techniques for generating different types of maps, such as thematic, weather maps, cartograms etc.
- e) Students are taught of the various cartographic works, Geographic Information System (GIS), handling and using of different types of gadgets and equipment including processing data collected from questionnaires during field work and other secondary sources for various requirement in their studies in accordance to the prescribe syllabus.
- Lectures and other teaching deliveries such as video recorded lectures and instructions are also communicated through telephonic calls, email, whats app mode etc etc.

Teaching methods-2019-2022

The teaching methods which are regularly practiced are as follows:-

- a) Lectures, explanation, group discussions, departmental and inter-departmental seminars.
- b) Illustration and demonstration with the help of chalk and blackboard/ white board, tools such as \maps, charts, models, tools and equipment, power point presentations, videos etc.
- Outdoor actual hand on demonstration and exercises during field works, surveys, extension programmes and study tours/excursions.
- d) Students are exposed and taught of the various cartographic techniques for generating different types of maps, such as thematic, weather maps, cartograms etc.
- e) Students are taught of the various cartographic works, Geographic Information System (GIS), handling and using of different types of gadgets and equipment including processing data collected from the field and other secondary sources for various requirement in their studies accordance with the prescribe syllabus.
- f) During the pandemic period when classes are delivered on on-line mode, lectures and other teaching deliveries such as video recorded lectures and instructions are communicated through telephonic calls, email, whats app group etc etc.

Head
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Synod College Some

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NORTH EASTERN HILL UNIVERSITY DEPARTMENT OF GEOGRAPHY Shillong - 793 022

H. J. Syiemlieh, M. Phil/Ph.D., Professor & Head

Email: hjsyiemlieh@rediffmail.com

hjsyiemlieh@nehu.ac.in Phone: 0364-2723211(O) 09436107682(M)

GE/2015-16/BUGS/18/ 10th March, 2015

To,
Mr. K. Joshi,
AR (Exam)
North Eastern Hill University
Shillong.

Sir,

Please find enclosed herewith the modification of restructuring Syllabus of UG in Geography for Semester System, the modification has been done as per your verbal advise and discussion.

This is for your information and necessary action.

Thanking you,

Yours faithfully,

(H.J. Sylemlieh)

Restructured Syllabus of UG in Geography for Semester System

SEMESTERS Total egory Papers II VI Ш IV MIC Engt EVS 4 Eng W 1 以 Both Eng! hers Paper I Paper II Paper III Paper IV Paper V Paper VII Physical Human 8 Geography Geography Economic Regional Geography Geography of of India Geography Geography of South Resources Theory+ Theory+ East Asia Theory Theory + Practicals Practicals and China Theory (100)Practicals (75:25)(75:25)(75:25)(100)(Hons.) (Pass and (Pass and Theory (Hons.) tours Hons.) Hons.) Paper VIII (100)Optional (Pass and Hons.) (Theory+ Paper VI Project) (75:25)Map Reading, RS, GIS and Surveying Theory+ Practical (50+50)(Hons.) Paper I ctive Paper II Paper III 3 ctive Paper I Paper II Paper III 3

ΙĬ



Paper-I PHYSICAL GEOGRAPHY (Pass and Honours)

Part A-Theory

Credits 3

Marks 75

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I Geomorphology (KA)

(i)Nature and scope of physical geography (ii) Definition of geomorphology and geological timescale (iii) Continental Drift, Sea Floor Spreading and Plate Tectonics (iv) Exogenetic geomorphic processesweathering, mass wasting and erosion

Unit-II Climatology (AP以)

(i) Definition of climatology (ii) Heat budget and heat balance (iii) Air masses, fronts, cyclones and anticyclones (iv) Koppen's scheme of classification of world climate (v) Global warming phenomenon

Unit-III Oceanography(IK)

(i) Definition of oceanography (ii) Ocean floor configuration and ocean deposits(overview) (iii) Ocean circulation- tides and ocean currents (iv) Coral reefs and classification (v)Theories of coral reef formation-subsidence and glacial

UNIT IV Biogeography (DDN)

(i) Definition of biogeography (ii) Global distribution of plants and animals (iii) World biomes-types and distribution (...) Concept of biodiversity and its depletion

UNIT V Soil and Water Resources (PRL)

(i) Concept of soil as a resource (.) Development of soil and soil profile (iii) Zonal classification of soil (iv) Hydrological cycle () Global water resources

Part B- Practical

Credit 1

Marks 25

7:18-

(Students are to complete a minimum of 8 exercises. In the end semester examination, students are to attempt any 2 questions out of 4. The questions will carry 6 marks each. Viva-voce and Practical notebook will carry 6 marks sach)

(i) Interpretation of landforms with the help of serial, superimposed, projected and composite profiles (from Toposheets of Survey of India (KN/PRL)

(ii) Slope analysis: Methods of Wentworth and Smith(IK)

(iii) Morphometric analysis of drainage basins: Stream ordering, Drainage density and Drainage • ; frequency (APN)

(iv) Representation of temperature and rainfall data by Hythergraph and Climograph (DDN)

Jeachor's initials: KN - K. Wanguin APW-A.P. Nargi DON - D. D. Nengnong IK - J. Kharbuki PRL - P. R. Kamaré

Department of Geography Synod College, Shillong. References and Suggested Readings

Ahmad, E. (2001): Geomorphology, Kalyani Publishers, New Delhi.

Ahmad, E. (2001): Physical Geography (Reprint), Kalyani Publishers, New Delhi

Birch, T.W. (1968): Maps: Topographical and Statistical, Clarendon Press, Oxford.

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Khan, Md. Z. A. (1998): Textbook of Practical Geography, Concept Publishing, New Delhi.

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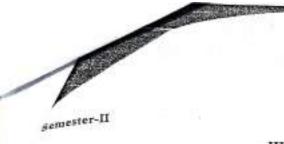
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Paper-II HUMAN GEOGRAPHY (Pass and Honours)

PART A: Theory Credits: 3 Marks 75

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I: History of Geography (DDN)

(i) Geography as the study of relationship between man and environment (ii) Development of Geographical Thought: Classical period (overview of the Greeks and Romans); Medieval period (overview of the Arabs); Modern (contributions of Humboldt and Ritter) (iii) Determinism and Possibilism in geography

Unit-II Cultural and Social Geography (KN)

(i) Nature and scope of Human geography (ii) Culture and cultural evolution (iii) Races and racial distribution (iv) Language and linguistic distribution (Social elements, composition and social structure

Unit-III Population Geography (K)

Population composition of the world- Age, Sex and literacy (ii) Distribution, density and growth of human population in the world (iii) Demographic transition and stable population (iv) Concepts of optimum, over and under population

Unit IV Settlement Geography (PRL)

(i) Evolution of human settlements and its determinants (ii) Types and pattern of rural settlements (iii) Definition of urban settlement, urbanization and global urban distribution (iii) Urban functions and land uses

Unit V Political Geography (APN)

(Systems of governmental organization-geopolitics (iv) Problem of uneven development and politics of global development

Part B- Practical

Credit 1

Marks 25

(Students are to complete a minimum of 8 exercises. In the end semester examination, students are to attempt any 2 questions out of 4. The questions will carry 6 marks each. Viva-voce and Practical notebook will carry 6 marks each)

(i) Scale of Maps- Enlargement and reduction of maps (square method) (KN)

(ii) Types of cartographic symbols and their uses- Population distribution maps (with uniform dots, spheres and choropleth methods) (DDV)

(iii) Population composition: Age and Sex pyramid (PRL)

(iv) Representation of socio-economic data using pie diagram, flow charts and transect chart (only human elements) (APU/IK)

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Semester-III

Paper-III GEOGRAPHY OF INDIA

Two (Honours)

Theory

Credits 4

Marks 100

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. The questions will be of equal value, carrying 15 marks each)

Unit-I Physical Environment (APA)

(i) Physical characteristics: Physiography, climate and climatic regions (Thornthwaite's), soil and natural vegetation

Unit-II Human environment (DDN)

(i) Population composition and its determinants-Age and sex, rural and urban, linguistic, religious, literacy and occupation (ii) Distribution, density and growth of population in India since Independence and associated problems

Unit-III Resources and Economy (PRL)

(i) Forest, minerals and agricultural resources, (ii) Agricultural Regions(crop combination regions) and their characteristics (iii) Industrial belts and their characteristics, (iv) Modes of transportation and its distribution

Unit-IV Physical Environment of North East India (IK)

(i) Physical setting: Physiography, climate, soil, natural vegetation and minerals

Unit-V Human Dimensions, Society and Development of NE India (KM)

(i) Human dimensions- Composition of population and its distribution-Schedule tribes and Schedule castes, rural and urban, literacy and religious composition (ii) Distribution, density, growth and migration of population (an overview) (iii) Types and characteristics of agricultural practices with special emphasis on 'shifting cultivation' (jhum) (iv) Types and distribution of industries with special emphasis on small scale, cottage and tourism and leisure industries.

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Gautam, A. (2006): Advanced Geography of india, Sharda Pustak bhawan, Allahabad.

Gopalakrishnan, R. (1991): North-East India: Land, People and Economy, Vikash Publishing House, New Delhi.

Khullar, D. (2000): India-A Comprehensive Geography, Kalyani publishers, New Delhi.

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Nag, P. and Roy, P. (1998): Geography of India, Concept Publications, New Delhi.

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Taher, M. and Ahmed, P. (1998): Geography of North East India, Eldorado Publications, Guwahati.

Tirtha, R. (1996): Geography of India, Rawat Publications, Jaipur.

Tirtha R. and Gopal Krishnan R. (1996): Emerging India, Rawat Publications, Jaipur.

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Paper-IV ECONOMIC GEOGRAPHY Pass & (Honours) for Science

Part A- Theory

Credits 3

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit -I Basic Concepts (KN)

(i) Nature and Scope (ii) Historical evolution of the world economic systems (iii) Recent trends in the development of Economic Geography (iv) Concept of developed and developing economies

Unit-II Geography of Economic Activities (IK)

(i) Sectors of economy-Primary, Secondary, Tertiary and Quaternary (ii) Concept of resource and classification of resources

Unit-III Primary Sector and Related Activities (APN/KN)

(i) Agricultural systems of the World (Whittlesey): (a) Nomadic herding (b) Intensive subsistence

(c) Mediterranean agriculture (d) Commercial grain farming (e)Mixed farming and (f) Plantation farming

(ii) World food crises, food surplus and deficit areas (iii) Forestry and lumbering activities (iv) World distribution and trade in Petroleum, Coal, Iron ore and Aluminium

Unit-IV Location and Distribution of Manufacturing Industries (PRL)

(i) Classification of manufacturing industries (ii) World distribution of Iron and Steel, Automobiles, Oil Refining and Petrochemical industries

Unit-V Tertiary and Quaternary Activities (KN)

modern Trade Routes 6: 19

(i) International trade: Modes of transportation and principal trade routes (ii) Service industries:

(a) Financial services (b) Tourism and Leisure (c) Knowledge services-ITES and IT services

*(iii) Technological innovations: Role of emerging economies of South East Asia, China and India

Part B- Practical

Credit I

Marks 25

(Students are to complete a minimum of 8 exercises. In the end semester examination, students are to attempt any 2 questions out of 4. The questions will carry 6 marks each. Viva-voce and Practical notebook will carry 6 marks each)

Application of statistical techniques in analysis of economic data:

(i) Measurement of central tendency-Mean, Median and Mode (IK)

(ii) Measures of dispersion-Mean and Standard deviation (IK)

(iii) Use of time series analysis and Index numbers in geographical studies (PRL)

(iv) Bi-variate, co-relation and regression analysis and students 't' test (APN)

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Berry, Blij L., et al., (1991): Global Economy, Prentice Hall Englewood Cliffs, New Jersey.

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Rogerson, P.A. (2010): Statistical Methods for Geography: A Student's Guide, Sage Publication,

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Thakur, A.K. (2011): Economic Geography and Development, Lakshi Publ., Guwahati.

Thomas, R. S. (1962): The Geography of Economic Activities, McGraw Hill, New York.

Semester V

Paper V REGIONAL GEOGRAPHY OF SOUTH EAST ASIA AND CHINA (Pass and Honours)

Theory

Credit 4

Marks 100

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. The questions will be of equal value, carrying 15 marks each)

UNIT-I Physical Geography(ヘタム/ひるん)

(i) Physical environment of SE Asia and China: Physiography, Drainage, Climate and Natural Vegetation

UNIT-II Human and Economic Geography of SE Asia (IK)

(i) Ethnicity and peopling of SE Asia (Races and Languages) (ii) Population distribution and growth (iii) Political Evolution of SE Asia (iv) Economic life: Agriculture, Manufacturing Industries and ASEAN

Textile / IT/ electronics/ UNIT-III Human Geography of the People's Republic of China (DAN)

(i) Ethnic diversities (racial and linguistic) and regions of China (ii) Population distribution and growth

(iii) Agriculture in China

UNIT-IV Economic Geography of the People's Republic of China (DAN/KN)

(i) Emergence of China as manufacturing super-house of the world (ii) Location and distribution of manufacturing industries (with special reference to textiles, metallurgical industries and consumer electronics industries and the Special Economic Zones (X) Foreign Direct Investments and the manufacturing corridors of China

UNIT-V External Trade of SE Asia and China (KN)

(i) External Trade of South East Asia, ASEAN with special reference to trade with India

(ii) China's global external trade; the growing trade and economic relation between India and China

References and Suggested Readings

Bailey, A. (2007): China: People, Place, Culture, History, D.K. Publ., Kindersley.

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Zhao, S., (1994); Geography of China: Environment, Resources, Population and Development, John Wiley & Sons, U.S.A.

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Department of Geograph Syned College, Smileng Semester- V

Paper VI MAP READING, RS, GIS AND SURVEYING (Honours)

Part A- Theory

Credits 2

Marks 50

(In the end semester examination, students are to answer 4 questions out of 8, selecting one from each unit. One question will carry 10 marks while the rest 9 marks each)

Unit-I Map Reading (KN/IK)

(i) History and significance of maps and map reading (ii) Types of map and their functions (iii) Map reading techniques: Concepts of point, line and area (iv) Map projections: Definition, classification and USCS

Unit-II RS and GIS(APN)

(i) Remote Sensing: Principles, Definition and characteristics (ii) GIS-Principles, definition and characteristics

Unit III Surveying (IK)

(i) Definition and characteristics (ii) Field methods in data collection (iii) Methodologies for socioeconomic survey (Household schedule and Focused group discussion)

Part B- Practical

Credits 2

Marks 50

(In the end semester examination, students are to answer any 2 questions out of 4, selecting at least 1 from \$\frac{1}{2}\$ each unit. The questions are of equal value, carrying 11 marks each. The Viva-voce and Practical notebook carries 7.5 marks each)-

Unit I- RS and GIS (PR4/WR)

(i) Visual interpretation of land use and land cover mapping using aerial photo and satellite imagery

(ii) GIS: Map digitization and co-ordinate registration using GIS software

Unit II Surveying (PRL/UR)

(i) Plane Table Survey- Land survey to establish linear measurement (intersection method)

(ii) Prismatic Compass: Open and close traverse survey

(iii) Dumpy Level: Longitudinal road profile

(iv) Transit Theodolite: Preparation of contour maps

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Archer, J. E. and Dalton, T.H. (1968): Field Work in Geography, William Clowes and Sons Ltd., London.

Bolton, T. and Bewbury, P.A. (1968): Geography Through Fieldwork, Blandford Press, London.

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Stilwel, J. and Clarke, G.(2004): Applied GIS and Spatial Analysis, John Willey & Sons, USA.

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Paper VII GEOGRAPHY OF RESOURCES Theory Credits 4 Marks 100 (Home)

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. The questions will be of equal value, carrying 15 marks each)

UNIT-I Basic Concepts (IK/KN)

(i)Definition and classification of resources (ii) Relationship between population and natural resources

(iii) Global availability of natural resources and limits to growth

UNIT-II Biotic Resources (IK/KN)

(i)Global distribution of Forest Resources (ii) Global distribution of marine fishing, fishing habitats, overfishing and consequences (iii) Global biodiversity, hot-spots and conservation (iv) Human resource concept, global human resource development in recent times (v) Concept of Human Development Index (UNDP & Planning Commission, Goyt, of India)

UNIT-III Abiotic Resources (PRL)

(i)Global incidence and distribution of energy minerals & gases (ii) Distribution of Ferrous & Nonferrous metals & Noble metals (iii) Marine resources (excluding Fishing)

UNIT-IV Resource, Development and Environment (APA)

(i)Natural resource use by developing and developed nations and politics of resources

(ii)Natural resource consumption and environmental consequences: Pollution and global warming

UNIT- V Resource Conservation (DON)

(i)Global land and food resources and their conservation (ii) Principles of conservation: efficiency in uses, recycling, substitutions and conservation areas (iii) Idea of sustainability (Efficiency and Equity)

References and Suggested Readings

Blanco, E. and Razzaque., J. (2011): Globilization and National Resources, Law, Challenges, Key Issues and Perspective, Edward Elgar Publ., U.K.

Brundtland, G.H. (1987): Our Common Future, UNCED Report, Geneva.

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Coe, N., Kelly, P. and Yeung, H.W.C. (2007): Economic Geography: A Contemporary Introduction, John Wiley and Sons, New York.

Dicken, P. (2007): Global Shift: Mapping the changing contours of the world economy, Sage Publ., New York.

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Roy, Prithwish (2005): Economic Geography: A Study of Resources, New Central Book Agency. Kolkata.

Wiebe, K. (2003): Land Quality Agricultural productivity and Food Security, Edward Elgar Publ.,

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emester VI

Paper-VIII (Honours-Optional)

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1. from each unit. One question will carry 12 marks while the rest 11 marks each)

Paper - VIII (a) GEOMORPHOLOGY

Marks 75 Part A- Theory Credits 3

Unit-I Fundamentals

(i) Nature and scope of geomorphology (ii) History of development of geomorphic ideas- Classical and Modern (iii) Historical and Regional approaches to the study of geomorphology

Unit-II Geomorphic Processes

(i) Endogenetic and Exogenetic Forces/Processes: Weathering and Mass Wasting processes (ii) Evolution of slope (iii) Processes of erosion, transportation and deposition and resultant landforms associated with work of running water, wind and glacier

Unit-III Evolution of Landforms

- (i) Evolution of landforms and drainage with special reference to folded and faulted structure
- (ii) Concepts of stream ordering given by Horton and Strahler (iii) Development of drainage systems and patterns

Unit-IV Concept of Base Level and Erosion Surfaces

- (i) Concepts of base level, graded profile and poly-cyclic erosion (rejuvenation of cycles)
- (ii) Concepts of erosion surfaces- identification and characteristics of peneplain and pediplain

Unit-V Regional Geomorphology

(i) Detailed geomorphological study of: (i) Eastern Himalaya Mountain (ii) Chotanagpur Plateau

(iii) Ganga Valley

Part B- Project

Credit 1

Marks 25

(The Topic of the project is to be related to the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary primary and secondary data. The data are to be used for preparation of the Project Report using suitable cartographic, statistical, RS and GIS techniques wherever necessary)

(Mark distribution: Project Report-10 marks; and Viva-voce 8 marks)

Ahmed, E. (2004): Geomorphology (reprint), Kalyani Publ., Ludhiana,

Bloom, A.L. (1978): Geomorphology-ASystemof Late Cenozoic Landforms, Prentice Hall, New Delhi.

Bloom, A. L. (1992): Geomorphology-A Systematic Analysis, PHI, New Delhi.

Dayal, P. (1996): A Text Book in Geomorphology, Shukla Book Depot, Patna.

Dury, G.H. (ed.): Essays in Geomorphology, Heinmann, London.

Holmes, A. (1975): Principles of Physical Geology (3rd edition), ELBS/Van Nostrand, Reinhold.

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Woolridge, S.W. and Morgan, R. S. (1960): Principles of Geomorphology, Longman Green, London.

Chorley. R. J. (1972): Spatial Analysis in Geomorphology, Methuen, London.

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Fairbridge, R. W. (1968): Encyclopedia of Geomorphology, Reinholdts. New York.

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Garner, H. F. (1974); The Origin of landscape-A Synthesis Geomorphology, Oxford University Press, London.

Dur, G.H. (1959): The Face of the Earth; Penguin, Harmondsworth .

Mitchell, C. W. (1973): Terrain Evaluation, Longman, London.

Ollier, C. D. (1979); Weathering, Longman, London.

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Sharma, H. S. (ed.) (1980): Perspectives in Geomorphology. Concepts, New Delhi,

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Skinner, B. J. and Porter, S.C. (1995): The Dynamic Earth. John Wiley, New York.

Sparks, B. W. (1960): Geomorphology, Longman, London.

Stoddart, D. R. (ed.) (1996): Process and Form in Geomorphology, Routledge, New York.

Thombury, W. D. (1960): Principles of Geomorphology, John Wiley, New York,

Paper- VIII (b) BIOGEOGRAPHY

Part A- Theory Credits 3 Marks 7

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I Fundamentals

(i) Nature, scope and significance (ii) Historical development of biogeography (iii) Nature of biosphere
 (iv) Basic ecological concepts and principles

Unit-II Distribution of Plants and Animals

 (i) Geographical distribution of plants and animals (ii) Factors influencing their distribution (biotic, abiotic, anthropogenic and historical) (iii) Phyto-geographic and zoo-geographic regions of the world

Unit-III Concept and Types of Ecosystem

(i) Concept of Ecosystem, Tropic Level, Food Chain, Food Web and Transfer of Energy (ii) Types of ecosystems: Terrestrial (grassland and desert ecosystem) and Aquatic (pond and marine ecosystem)

Unit-IV Biodiversity

(i) Concept of Biodiversity (ii) Biodiversity loss and its conservation (iii) Biodiversity 'hot spots' of the world (iv) Status of Biodiversity in North-East India

Unit-V Conservation and Management of Ecological Regions

- (i) Study of the following ecological regions of India in relation to plant and animal diversity, interrelations, problems, conservation and management:
 - (i) Tropical Rain Forest
 - (ii) Mangroves

Part B- Project Credit 1 Marks 25

(The Topic of the project is to be related the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary primary and secondary data. The data generated are to be used for preparation of the Project report using suitable cartographic, statistical, RS and GIS techniques wherever necessary)

(Mark distribution: Project Report-10 marks; and Viva-voce 8 marks)

Paper VIII (c) POPULATION GEOGRAPHY (Optional)

Part A- Theory

Credits 3

Marks 75

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I Fundamentals

(i) Definition, nature, scope and objective (ii) Development of population geography as a field of specialization (iii) Sources of population data and their levels of reliability

Unit-II Population Composition

(i) Composition of population of the world: (a) age and sex (b) literacy and level of education

(ii) Occupational and economic composition: its characteristics, determinants and regional pattern

Unit-III Population Distribution

(i) Distribution and density zones of global population: determinants; the emerging regional patterns and the associated problems

Unit-V Population Growth

(i) Components of population growth and its determinants (ii) World pattern of fertility and mortality (iii) Demographic Transition model and its applicability in India (iv) Theories of population growth: Malthus and Marxian view

Unit-V Migration

(i) Types, determinants and consequences of migration (ii) Ravenstein's model of migration

Part B-Project

Credit 1

Marks -25

(The Topic of the project is to be related to the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary secondary and primary data. The data generated are to be used for preparation of the Project report using suitable cartographic, statistical, RS and GIS techniques where ever necessary)

(Mark distribution: Project Report-10 marks; and Viva-voce 8 marks)

Mark Co. In

Bogue, D.J. (1969): Principles in Demography, John Wiley, New York.

Bose, A. et al. (1974): Population in India's Development (1947-2000), Vikas Publication House, New Delhi.

Chandna, R. C. (2000): Geography of Population, Kalyani Publ., New Delhi.

Clarke, John I. (1973): Population Geography, Pergamon Press, Oxford.

Crook, Nigel (1997): Principal of Population and Development, Pergamon Press, New York.

Gamier, B. J. (1970: Geography of Population, Longman, London.

Kochhar, Rajesh (2000): The Vedic People: Their History and Geography, Orient Longman Ltd. New Delhi.

Mamoria, C.B. (1981): India's Population Problems, Kitab Mahal, New Delhi.

Mitra, Ashok (1978): India's Population Problems and Control (Vol. I & II), Kitab Mahal, New Delhi.

Mitra, Ashok (1991): India's Population: Heading Towards a Billion, B.R Publ. Corp., New Delhi.

Premi, M.K. (2007): Population of India, NBT, New Delhi.

Srinivasan, K. and Vlassoff, M. (2001): Population and Development Nexus in India, Challenges for

the new Millennium, Tata McGraw Hill, New Delhi.

Sundaram K. V and Nangia, Sudesh (eds.) (1986): Population Geography, Heritage, New Delhi.

Wood, R. (1979): Population Analysis in Geography, Longman, London.

Zelinsky, Willbur (1966): A Prologue to Population Geography, Prentice Hall, New Jersey.

Paper VIII (d): URBAN GEOGRAPHY (0ptional)

Part A- Theory

Credits 3

Marks 75

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I Fundamentals

 (i) Nature and scope (ii) Recent trends in urban geography (iii) Definition of urban places and urban agglomerations - city, metropolis, conurbation and megalopolis

Unit-II Origin and Growth and Morphology of Urban Centres

(i) Origin and growth of urban centers (ii) Functions and functional classification of towns
 (iii) City hierarchy and rank-size relationship (iv) Urban morphology and City morphology models-Concentric Circle, Sector and Multiple Nuclei models

Unit-III History of Urbanization in India

(i) History of urbanization in India in (a) Ancient period (b) Medieval period, and (iii) Modern times

Unit-IV Growth of Indian Cities

(i) Urbanization and growth of Indian cities since 1950 (ii) Location and regional distribution of urban centres (iii) Problems of small and medium towns

Unit-V Metropolitan Cities and Planning in India

(i) A study of the characteristics, problems and planning issues of Delhi, Mumbai and Kolkata

Part B-Project

Credit 1

Marks 25

(The Topic of the project is to be related the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary primary and secondary data. The data generated are to be used for preparation of the Project report using suitable cartographic, statistical, Rs and GIS techniques where ever necessary)

(Mark distribution: Project Report-10 marks; and Viva-voce 8 marks)

Alam, S.M. (1964): Hyderabad Secunderabad-Twin Cities, Asia Publ. House, Bombay. Berry, BJ.L. and Horton, F.F. (1970): Geographic Perspectives on Urban Systems. Prentice Hall, New Jersey.

Carter, H. (1972): The Study of Urban Geography, Edward Arnold, London.

Dickinson, R.E. (1964): City and Region, Rutledge, London.

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Dwyer, D J. (ed.) (1971): The City as a Centre of Change in Asia, University of Hong Kong Press, Hongkong.

Gibbs, J.P. (1961): Urban Research Methods D. Van Nostrand Co. Inc. Princeton, New Jersey.

Hall, P. (1992): Urban and Regional Planning, Routledge, London.

Hall, T. (ed.) (2006): Urban Geography Routledge, London.

Houser, Philip M. and Schnore Leo F.(eds.) (1965): The Study of Urbanization, John Wiley, New York. James, P. and Jones, C.F.(eds.) (1954): American Geography: Inventory and Prospect, Syracuse

University Press, Syracuse. Kundu, A. (1992): Urban Development Urban Research in India, Khanna Publ. New Delhi.

Mandal, R.B. (1992): Urban Geography, Concept Publ., New Delhi.

Mayer, H.M. and Kohn, C.F. (eds.) (1995): Readings in Urban Geography, University of Chicago Press, Chicago.

Nangia, Sudesh (1976): Delhi Metropolitan Region: A Study in Settlement Geography, Rajesh Publication, New Delhi.

Raj Bala (1992): Urbanisation in India, 1901-1991, Rawat, Jaipur.

Ramchandran, R. (1988): Urbanization and Urban System in India, Oxford Publication, New Delhi. Rao, V.L.S.P. (2000): Urbanisation in India-Spartial Dimensions, Concept Publ., New Delhi.

Paper VIII (e): AGRICULTURAL GEOGRAPHY (Optional) Part A- Theory Credits 3 Marks 75

(In the End Semester Examination, students are to answer 5 essay type questions out of 10, selecting 1 from each unit. One question will carry 12 marks while the rest 11 marks each)

Unit-I Fundamentals (IK)

 (i) Nature and scope (ii) Approaches to the study of agricultural geography (commodity, economic, regional, systematic and ecological) (iii) Relationship of agricultural geography with economics, sociology and statistics

Unit-II Origin and Diffusion of Crops (PRL)

 (i) Origin of agriculture and diffusion of crops during the: (i) pre-historic (ii) medieval, and (iii) modern times (ii) Physical, socio- economic and technological determinants of agriculture

Unit-III Agricultural Systems of the World (APK)

 (i) Agricultural systems of the world (Whittlessey's scheme): Shifting cultivation, intensive and extensive agriculture, commercial grazing, plantation agriculture and truck farming (horticulture)

Unit-IV Distribution and Patterns of Indian Agriculture (KA)

(i) Bases of agricultural regionalization: crop concentration, crop combination, crop diversification
 (ii) Distribution and characteristics of agro-climatic regions (iii) Production and productivity of the major food crops (iii) Food surplus and deficit areas and associated problems

Unit-V Indian Agriculture: Attributes and Issues (DDN)

 (i) Green Revolution and recent trends in Indian agriculture (ii) Agricultural development in North-East India: problems and prospects of agriculture

Part B-Project Credit 1 Marks -25

(The Topic of the project is to be related the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary primary and secondary data. The data generated are to be used for preparation of the Project report using suitable cartographic, statistical, Rs and GIS techniques where ever necessary)

(Mark distribution: Project Report-10 marks; and Viva-voce 8 marks)

Jeacher's initials:

KN: K. Norgum APW: A.P Warjai

DDN: D.D Nenghong IK: I. Kharbuki

PRL: P. R. Lamare

Euro College, Street

Anderson, E. (1970); Geography of Agriculture, W.M. C. Brown Co, Iowa.

Bayliss Smith, T. P. (1987): The Ecology of Agricultural Systems, Cambridge University Press, London.

Berkry, B. J. L. et al., (1967): The Geography of Economic Systems. Prentice Hall, New York.

Dyson, T. (1996): Population and Food- Global Trends and Future Prospects, Routledge, London.

Gregor, H. P. (1970): Geography of Agriculture. Prentice-Hall, New York.

Grigg, D.B. (1974): The Agricultural Systems of the World, Cambridge University Press, New York.

Husain, M. (1996): Systematic Agricultural Geography Rawat Publications, Jaipur.

Mishra, R. P. (1967): Diffusion of Agricultural Innovations, University of Mysore, Mysore.

Mohammad, A. (1978): Studies in Agricultural Geography, Rajesh Publications, New Delhi.

Morgan, W. B. and Norton, R.J.C. (1971): Agricultural Geography. Methuen, London.

Sauer, O. C. (1969): Agricultural Origins and Dispersals. MIT Press, Cambridge.

Sen, S. (1975): Reaping the Green Revolution. Tata McGraw-Hill, New Delhi.

Shafi, M. (2000): Agricultural Geography of South Asia, McMillan, Delhi

Shafi, M. (2006): Agricultural Geography, Pearson Education, New Delhi.

Singh, B.B. (1979): Krishi Bhugol. Tara Publications, Varanasi.

Singh, J. and Dhillon, S.S. (2000): Agricultural Geography. Tata McGraw Hill, New Delhi.

Singh, S. (1994): Agricultural Development in India: A Regional Analysis, Kaushal Publ., Shillong.

Singh, J. et al., (1984): Agricultural Geography, TataMcGrawhill, New Delhi.

Symon, L. (1968): Agricultural Geography, George Bell and Sons, London.

Tanant, J.R. (1974): Agricultural Geography, David & Charles, Newton.

Reference and Suggested Readings (for Project Report under Optional Paper)

Archer, J. E. and Dalton, T.H. (1968): Field Work in Geography, William Clowes and Sons Ltd., London.

Bolton, T. and Bewbury, P.A. (1968): Geography through Fieldwork, Blandford Press, London. Flowerdew, Robin and Martin David (eds.) (2005): Methods in Human Geography (Second Edition), Pearson Education Ltd., Harlow.

Gomm, Roger (2004): Social Research Methodology: A critical introduction, Palgrave Macmillan, New York.

Jones, P.A. (1968): Field Work in Geography, Longmans, Green and Company Ltd., London.

Kapur, Anu (2002): Voice of Concern, Concept, New Delhi.

Kumar, R. (2011): Research Methodology (Third Edition), SAGE, New Delhi.

Lousenbury, J.F. and Aldrich, F.T. (1986): Introduction to Geography Field Methods and Techniques, Charles E. Merrill Publ. Co., Colombus.

Misra, H.N. and Singh, V.P. (2002): Research Methodology in Geography, Rawat, New Delhi.

Monkhouse, F. J. and Wilkinson, F.J. (1985): Maps and Diagrams. Methuen, London.

Pugh, J.C. (1975): Surveying for Field Scientists, Methuen and Company Ltd., London.

Raina, R.M. (2011): Research in Geography: Trends and techniques, Sumit Enterprises, New Delhi.

Robinson, G.M. (1998): Methods and Techniques in Human Geography, John Wiley & Sons,

Chichester.

Sarkar, A. K. (1997): Practical Geography: A Systematic Approach, Orient Longman, Kolkata. Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda Pustak Bhawan, Allahabad. Singh, R.L. and Rana, P.B. (1993): Elements of Practical Geography. Kalyani Publishers, New Delhi. Trivedi, R.N. and Shukla, D.P. (1996): Research Methodology, Radha Publ., New Delhi.

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NORTH EASTERN HILL UNIVERSITY SHILLONG

REVISED UNDERGRADUATE SYLLABUS

GEOGRAPHY

Features of UG Syllabus in Geography for CBCS Curriculum

- As the CBCS Curriculum (a) Arts Stream students will have to complete three semesters Elective Papers and one semester English and MIL/Alt. English paper and (b) Science Stream students will have to complete four semesters with Elective Papers.
- In the 'Arts Stream' Geography Honours students can opt for any two of the following elective subjects:
- (i) Political Science (ii) Economics (iii) History (iv) Sociology (v) Anthropology
- (vi) Philosophy (vii) Education
- In the 'Science Stream' Geography Honours students can opt for any two of the following elective subjects:
- (i) Botany (ii) Zoology,(iii) Chemistry (iv) Physics (v) Mathematics (vi) Geology
- (vii) Environmental Science (vii) Statistics
- 4. Geography Honours students will have to prepare a Project Report in Sixth Semester. The report will carry 25 marks (19 marks for the report and viva-voce + 6 marks for Internal Assessment). Out of 19 marks, 14 marks will be for the report and 5 marks for Viva-voce. The Topic of the project is to be related the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc).

Revised UG Syllabus in Geography for CBCS Curriculum Structure

Arts Stream:

Category	SEMESTER						
	1	11	111	IV	V	VI	
English				1	1		2
Environmental Studies						1	1
MIL/Alt. Eng				1			1
Elective I	1	1	1				3
Elective II	1	1	1				3
Elective (Hon)	Human Geography	Physical Geography	Geography of India	Economic Geography	Regional Geography of India Map Reading, RS & GIS**	Geography of Resources Optional Papers	8
Marks Distribution	Theory - 19:56=75 (Internal evaluation: External evaluation)						
	Practical - 06:19=25 (Internal evaluation : External evaluation)						
	** Map reading, RS & GIS: Theory - 12:38 = 50 & Practical 12:38 = 50						

Science Stream:

Category	SEMESTER						
	1	11	Ш	IV	V	VI	
English					1		1
Environmental Studies						1	1
MIL/Alt. Eng							
Elective I	1	1	1	1			4
Elective II	1	1	1	1			4
Elective (Hon)	Human Geography	Physical Geography	Geography of India	Economic Geography	 Regional Geography of India Map Reading, RS & GIS** 	Geography of Resources Optional Papers	8
Marks Distribution	Theory - 19:56=75 (Internal evaluation : External evaluation)						
	Practical - 06:19=25 (Internal evaluation : External evaluation)						
	** Map reading, RS & GIS: Theory - 12:38 = 50 & Practical - 12:38 = 50						

Credit Distribution and Outline of Courses for Honours and Pass (Geography)

Semester	Paper No. & Title	Paper (Th./Prac.)	Credits	Marks division (Internal «External)	Total Marks	Total Credits
(Hons. and Pass)	Paper I (GE: 101) Human Geography	Theory	3	19 + 56 = 75	100	4
		Practical	1	06+19 = 25		
II (Hons. and	Paper II (GE: 201) Physical Geography	Theory	3	19 + 56 = 75	100	4
Pass)		Practical	1	06+19 = 25		
III (Hons. and Pass)	Paper III (GE: 301) Geography of India	Theory	4	25 + 75	100	4
IV	Paper IV (GE: 401)	Theory	3	19 + 56 = 75	100	4
(Hons.) and Pass for only Science Stream	Economic Geography	Practical	1	06+19 = 25		
V (Hans.)	Paper V (GE: 501) Regional Geography of North East India	Theory	4	25 + 75	100	4
	Paper VI (GE: 5057) Map Reading, RS, GIS and Surveying	Theory	2	12+38= 50	100	4
		Practical	2	12+38= 50		
VI (Hons.)	Paper VII (GE: 601) Geography of Resources	Theory	4	25 + 75	100	4
	Paper VIII (GE: 602) Optional Paper (Any one from the following): (a) Geomorphology (b) Biogeography (c) Population Geography (d) Urban Geography (e) Agricultural Geography		3	19 + 56 = 75	100	
		Project	1	06+19 = 25		4

Semester-I

Paper: I (GE 101) HUMAN GEOGRAPHY (Pass and Honours)

PART A: Theory Credits: 3 Marks 75 (Internal: 19)

(In the End Semester Examination, students are to answer 5 questions out of 10 selecting at least ONE from each unit. Unit 1 will carry 12 marks while the remaining units will carry 11 marks each)

Unit 1- Introduction to Geography (PRL)

(i) Definition, Nature & Scope of Geography, Branches & Sub Branches (ii) Geography as a study of relationship between man and environment (Determinism/Possibilism/Neo-Determinism approaches), (iii) Relationship of Geography with other subjects Economics/sociology/history/botany/zoology/statistics).

Unit II - History of Development of Geography (DDN)

Development of Geographical Thought: (i) Classical period: Greeks and Romans; (ii) Medieval period: Arabs; (iii) Modern: Alexander von Humboldt, Carl Ritter and Vidal de la Blache

Unit-III - Social Geography (KN)

(i) Definition, Nature & Scope (ii) Racial Strains in Human Population and their distribution (iii) Languages and their distribution (iv) Religion and their distribution

Unit-IV - Population Geography (TK)

- (i) Definition, Nature &Scope (ii) Growth, distribution, density of human population in the world
- (iii) Demographic Transition model (iv) Concepts of optimum, over and under population

Unit - V - Settlement Geography (APN)

- (i) Definition, Nature & Scope (ii) Types and pattern of rural settlements
- (iii) Functional classification of urban settlement (iv) Concept of Towns, Cities, Metropolis, Conurbation.

Part B- Practical

Credit 1

Marks 25 Time: 3Hrs (Internal:6)

(In the End Semester Examination, students are to attempt 2 questions out of 3. Question will carry 7 marks each. Practical Notebook will carry 3 marks & Viva voce will carry 2 marks)

- (i) Scale of Maps: Enlargement and reduction of maps (square method) (KN)
- (ii) Types of cartographic symbols and their uses: Population distribution maps (with uniform dots. spheres and choropleth methods) (DDN/PRL)
- (iii) Representation of Social Data (Language & Religion) using pie diagram (IK)

Jeacher & Initials: KN-K. Mongrum

APN-A. P. Warzin

DDN-B. D. Nengnong

UG Syllabus in Geography 2019

IK- J. Kharbuki

PRL-P. R. Lamaxe

nartment of Geography Synod College, Shillong

Bergman, E.F. (1995): Human Geography-Culture, Connections and Landscape, Prentice Hall, New Jersey.

Chisholm, M. (1975): Human Geography, Penguin Books, Hermondsworth.

Cunningham, Lawrence et al., (1982): Culture and Values, Hort, Rinehart and Winston, New York.

De Blij, H.J. (1999): Human Geography, John Willey and Sons, New York.

Dikshit R.D. (1994): The Art and Science of Geography, Prentice Hall of India, New Delhi.

Dikshit R.D.(2000): Geographical Thought-A Contextual History of Ideas, Prentice Hall of India, New Delhi.

Dikshit, R.D. (2000): Political Geography: The Spatiality of Politics, Tata McGraw Hill, New Delhi.

Hartshorne, R. (1959): Perspective on the Nature of Geography, McNally and Co., Chicago.

Harvey, D.(1972): Explanations in Geography, Edward-Arnold, London.

Hazra, Jayati et al., (1977): Dimensions of Human Geography, Rawat Publications, Jaipur.

Holt, J.A. (2001): Geography; Its History and Concept, Longman, London.

Hopkins, I. (1982): An Introduction to Human Geography, Widenfeld and Nicolson, London.

Husain, M. (1984): Evolution of Geographical Thoughts, Rawat Publications, Jaipur.

James, R. (2000): Contemporary Human Geography, Dorling-Kindersley Publications, London.

James, R.(2010): The Cultural Landscape-An Introduction to Human Geography, Prentice Hall of India, New Delhi.

James, P.E. (1980): All Possible World: A History of Geographic Ideas, Sachin Publications, Jaipur.

James, R. (2010): The Cultural Landscape-An Introduction to Human Geography, Prentice Hall of India, New Delhi.

Jhonston, R.J. et al., (1991): The Dictionary of Human Geography (3" Edition, Reprint), Blackwell Publishers, U.K.

Knox, P.L. and Marston Sallie (2001): Places and Regions in Global Context: Human Geography(2nd Edn.), Prentice Hall, New Jersey.

Kobayashi, A. and Mackenzie, S. (1989): Remaking Human Geography, Unwin Hyman, Boston.

Minshull, R. (1970): The Changing Nature of Geography, Huchinston University Library, London.

Mohammad, N. (2008): Practical Work in Geography, Sunflower Publishers, New Delhi.

Monkhouse, F.J. and Wilkinson H.R. (1989): Maps and Diagrams(Reprint), B.I. Publications, New Delhi.

Orford, E.J. (1935): Senior Practical Geography, University of London, London.

Perpillau, A.V. (1979): Human Geography(2ndEdn.), Longman, England.

Raisz, E. (1985): Principles of Cartography, McGraw Hill, New York.

Robinson, A.H. (1985): Elements of Cartography, John Willey & Sons. New York.

Sarkar, A. (1997): Practical Geography, Orient Longman, Kolkata.

Singh, Gopal (1998): Map Work and Practical Geography, Vikas Publishing, New Delhi.

Singh, L.R. (2006): Fundamentals of Practical Geography, Sharda pustak bhawan, Allahabad

Singh, L.R. (2002): Fundamentals of Human Geography, ShardaPustakBhawan, Allahabad.

Singh. R.L. (1979): Elements of Practical Geography Kalyani Publishers, New Delhi.

Talukdar, S. (2008): Introduction to Map Projections, EBH Publishers, Guwahati.

Wooldridge, S.W. (1956): The Geographer as Scientist, Thomas Nelson and Sons Ltd., London.

Semester-II

Paper II (GE: 201) PHYSICAL GEOGRAPHY (Honours and Pass)

Part A-Theory

Credits 3

Marks 75 (Internal: 19)

(In the End Semester Examination, students are to answer 5 questions out of 10 selecting at least ONE from each unit. Unit 1 will carry 12 marks while the remaining units will carry 11 marks each)

Unit-1: Geomorphology (KN)

(i) Concept, Nature and Scope (ii) Geological Timescale (iii) Plate Tectonics (iv) Exogenetic geomorphic processes: weathering, mass wasting (v) Concept of landform development (Davis & Penck)

Unit-II: Climatology (APN)

(i) Definition, Nature and Scope (ii) Heat Budget and heat balance (iii) Classification of Air masses, fronts, cyclones and anti-cyclones (iv) Koppen's scheme of classification of world climate

Unit-III: Oceanography (IK)

(i) Definition, Nature and Scope (ii) Ocean floor configuration (Pacific, Atlantic & Indian) and Ocean deposits (iii) Ocean Currents (Pacific, Atlantic & Indian) (iv) Coral reefs: classification

UNIT IV : Biogeography (DDN)

(ii) Concept, Nature and Scope (ii) Global distribution of plants (iii) Global distribution of plants and unimals (iv) Concept of biomes: Tropical forest & Grassland biomes (iv) Biodiversity: concept and significance

UNIT V : Pedology (PRL)

(i) Factors of Soil formation (ii) Soil forming processes (iii) Physical & Chemical Properties of Soil (iv) Soil Profiles (laterite, podzol, chernozem).

Part B- Practical

Credit 1

Marks 25 Time: 3Hrs

(Internal: 6)

(In the Eiio Semester Examination, students are to attempt 2 questions out of 3. Question will carry 7 marks each. Practical Notebook will carry 3 marks & Viva voce will carry 2 marks)

(i) Interpretation of landforms with the help of Serial, Superimposed, Projected and Composite profiles (Toposheets of Survey of India); Slope Analysis: Smith's Method (PRL/IK)

(ii) Morphometric Analysis of Drainage Basins: Stream Ordering and Drainage Frequency (APN)

(iii) Representation of temperature and rainfall data (Hythergraph and Climograph) (DAN)

Jeacher's Initials: KN- K. Norgum

APN - A.P Warji BBN - D. D. Wenghong IK. I. Kharbuki

UG Syllabus in Geography 2019 PRL - P. R. Lamare

Page 7

Department of Geography Synod College, Stullano

Ahmad, E.(2001): Geomorphology, Kalyani Publishers, New Delhi.

Ahmad, E.(2001): Physical Geography (Reprint), Kalyani Publishers, New Delhi

Birch, T.W. (1968): Maps: Topographical and Statistical, Clarendon Press, Oxford.

Christopherson, R.W. (2011): Geosystems: An Introduction to Physical Geography, Prentice Hall, New Jersey.

Critchfield, H. (1975): General Climatology, Prentice Hall, New York.

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Pettersen, J.F., Sack, D., and Robert, E. (2010): Fundamentals of Physical Geography, Cenegage Learning, USA.

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Singh, S. (1998): Geomorphology, Prayag Pustakalaya, Allahabad.

Strahler, A.N. and Strahler, A.H. (1992): Modern Physical Geography, John Willey & Sons, New York.

Thompson, R.D. et al., (1986): Processes in Physical Geography, Longman, London.

Thornbury, W.D. (1960): Principles of Geomorphology, John Willey & Sons, New York.

Trewartha, G.T. (1980): An Introduction to Climate, McGraw Hills, New York.

Wooldrige, S.W. and Morgan, R.S. (1959): The Physical Basis of Geography-An Outline of Geomorphology, Longman Green & Co., London.

Semester-III

Paper III: GE 301 GEOGRAPHY OF INDIA

(Honours)

Theory

Credits 4

Marks 100 (internal: 25)

In the End Semester Examination, students are to answer 5 questions out of 10, selecting at least 1 from each unit. The questions will be of equal value, carrying 15 marks each)

Unit-! Physical Environment (KN/APN)

(i) Physiography (ii) Climate and Climatic regions (Koppen's scheme) (iii) Soil and (iv) Natural Vegetation

Unit-II Human Environment (KN/APN)

 Growth, Distribution and density of population in India since Independence and associated problems (ii) Population composition: Literacy (iii) Urban growth and process of Urbanisation

Unit-III: Resource Base (IK)

- (i) Forest (flora) (ii) Energy (coal, petroleum, uranium) (iii) Minerals (iron ore, manganese & bauxite)
- (iv) Agricultural resources (tea, rubber, rice, wheat, cotton)

Unit-IV: Economic Regions (PRL)

(ii) Agricultural Regions (ICAR, 1982) and their characteristics (iii) Industrial belts and their characteristics (iii) Modes of transportation and its distribution (Road, Railway & Inland Waterways)

Unit-V: Basis of Regionalisation (DDN)

(i) Spate's & R.L. Singh's Scheme of Regional Division of India (ii) Detailed Study of Any One Macro region under (a) Physiography (b)Climate (c) Drainage (d) Soil (e) Natural Vegetation

References and Suggested Readings

Ahmad, A. (1999): Social Geography, Rawat Publications, Jaipur.

Gautam, A. (2006): Advanced Geography of India, Sharda Pustak bhawan, Allahabad.

Gopalakrishnan, R. (1991): North-East India: Land, People and Economy, Vikash Publishing House, New Delhi.

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Paul, S. (1967): Physical Geography of India, Orient Longman, Calcutta.

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Spate, O.H.K. and A.T. Learmonth (1967): India and Pakistan: A General and Regional Geography, Methuen & Co., London.

Taher, M. and Ahmed, P. (1998): Geography of North East India, Eldorado Publications, Guwahati.

UG Syllabus in Geography 2019

Seacher's Initials: KN. KNongrum

APN- A.P. Margie DDN- 8.D. Neugrong IK- J. Kharbuhi PRL - P. R. Lamare

Page 9

Department of Geography

Synod College, Shilling

Firtha, R. (1996): Geography of India, Rawat Publications, Jaipur. tirtha R. and Gopal Krishnan R. (1996): Emerging India, Rawat Publications, Jaipur.

Semester IV

Paper IV: GE 401 ECONOMIC GEOGRAPHY (Honours)

Part A- Theory

Credits 3

Marks 75 (Internal: 19)

(In the End Semester Examination, students are to answer 5 questions out of 10 selecting at least ONE from each unit. Unit 1 will carry 12 marks while the remaining units will carry 11 marks each)

Unit -I Basic Concepts (KN)

(i) Definition , Nature and Scope (ii) Evolution of the world economic systems (iii) Growth and Development (iv) Basic characteristics of developed and developing Economies

Unit-II Resources and Economic Activities (IK)

(i) Concept and Classification of Resources (ii) Sectors of Economy: Primary, Secondary, Terriary , Quaternary, Quinary

Unit-III Primary Sector and Related Activities (APN)

- (i) Agricultural systems of the World (Whittlesey): (a) Intensive subsistence
- (b) Commercial grain farming and (c) Plantation farming (ii) Von Thunen's Theory (iii) World distribution of Crude Oil, Coal, Iron ore.

Unit-IV Secondary Sector and Related Activities (PRL)

(i) Factors affecting location of industry (ii) Theory of Industrial Location (Weber) (iii) Classification of manufacturing industries (iv) World distribution of Iron and Steel, Automobiles and Petrochemical **Industries**

Unit-V Tertiary, Quaternary and Quinary Activities (DDN)

(i) Modes of transportation: Land & Water (ii) Trade Blocs: South Asia,

Asia-Pacific, Principal Trade Routes (Panama, Suez) [iii] Service industries: Tourism (iv) Knowledge services ITES and IT services

Part B- Practical

Credit 1

Marks 25 Time: 3 Hrs

(Internal: 6)

(In the End Semester Examination, students are to attempt 2 questions out of 3. Question will carry 7 marks each. Practical Notebook will carry 3 marks & Viva voce will carry 2 marks).

Application of statistical techniques in analysis of economic data:

(i) Frequency Distribution and Measurement of central tendency (Mean, Median and Mode)

(ii) Measures of dispersion (Mean and Standard deviation); Bi-variate Co-relation, Regression analysis and students 't' test (IK/APN)

(نَوْنَ) Use of time series analysis and Index numbers in geographical studies (PRL)

UG Syllabus in Geography 2019

Jeachers' dritials: KN-K. Norgrum APN-A.P. Navigni DEN- J. S. Nengmong IK- J. Kharbuki

Department of Geography Synod College, Shittong

Alexander, J.E. (1974): Economic Geography, Prentice Hall, New Jersey.

Berry, Blij L., et al., (1991): Global Economy, Prentice Hall Englewood Cliffs, New Jersey.

Boesch, H. (1964): Geography of World Economy, D. Van Nostrand Co., New York.

Chapman Mc Grew, J. and Monroe, C.B. (2000): An Introduction to Statistical Problems Solving in Geography, McGraw Hills, New York.

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Cryson, J., Henry, N., Keeble, D. and Maertin, R. (2004): The Economic Geography Reader, John Willey & Sons. Ltd., Chichester.

David, E. (1985): Statistics in Geography, Blackwell, USA.

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Ghosh, M.C. (1988): Modern Economic Geography Modern Book Agency, Kolkata.

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Griggs, D.B. (1974): The Agricultural Systems of the World, Cambridge University Press, New York.

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Hartshorne, T.N. and Alexdander, J.W. (1988): Economic Geography, Prentice Hall, New Delhi.

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Mahmood, Aslam (2002): Statistical Methods in Geography (Reprint), Rajesh Publication, New Delhi.

Mamoria, C.B. (1997): Economic and Commercial Geography of India, Shiva Lal Publications,
Agra.

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Negi, B. S.(1985): Economic and Commercial Geography of India Kedar Nath Ram Nath , Meerut.

Peet, Richard (1999): Theories of Development, Rawat Publication, Jaipur.

Raza, M. and Agarwal, Y. (1986): Transport Geography of India, Concept Publishing, New Delhi.

Rogerson, P. A. (2010): Statistical Methods for Geography: A Student's Guide, Sage Publication, Kolkara

Roy, Prithwish Kumar (1986): Economic Geography New Central Book, Kolkata:

Sarkar, A. (2015): Practical Geography: A systematic approach, Orient BlackSwan, New Delhi

Singh, R.L. (1998): Elements of Practical Geography (Revised), Kalyani Publishers, New Delhi.

Smith, D.M. (1971): Industrial Location-An Economic Geographical Approach, John Willey, New York.

Thakur, A.K. (2011): Economic Geography and Development, Lakshi Publ., Guwahati.

Thomas, R. S. (1962): The Geography of Economic Activities, McGraw Hill, New York.

Semester V

Paper V: GE5 501 REGIONAL GEOGRAPHY OF NORTH EAST INDIA (Honours)

Theory

Credit 4

Marks 100 (Internal: 25)

(In the End Semester Examination, students are to answer 5 questions out of 10, selecting at least 1 from each unit. The questions will be of equal value, carrying 15 marks each)

Unit-I: Physical Environment of North East India (IK)

(i) Physical Setting: Location, Physiography, Climate, Drainage, Soil, Natural Vegetation

Unit-II: Demographic Dimensions (DDN)

(i) Population growth since Independence (ii) Population distribution, density (iii) Age-Sex composition (iv) Literacy (v) Migration

Unit - III: Social Dimension (KN)

(ii) Racial strains in Population (ii) Tribe (iii) Language (iv) Religion

Unit - IV: Economic Dimension (APW)

(i)Agriculture: types and characteristics of agricultural practices (ii) Shifting Cultivation: Characteristics, Problems and Consequences (iii) Mineral and Energy resources (limestone, silliminite, coal, oil and hydro) (iv) Industries (Oil refining, Petrochemical, Small scale and cottage, Tourism)

Unit - V: Development & Contemporary Issues (DDN)

(i) Transportation (Land: Road & Railway; Inland Waterway), (ii) Communication – problems and prospects (iii) Integrated Rural Development and Planning for Backward Area (iv) Act East Policy

Jeacher's Initials: KN-K. Nongrum

APN-A. P. Narjai

DDN-D.D. Neugnong

IK-J. Kharbuki

PRL - P. R. Lamore

Department of Geographs Byood College, Shillong

Dikshit, K.R. et al (2014): North-East India: Land , People and Economy, Advances in Asian Human Environment Research, Springer, New York-London.

Gopalakrishnan, R. (1991): North-East India: Land, People and Economy, Vikash Publishing House, New Delhi.

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Barpujari, H.K. (1970): Problems of the Hill Tribes of North East India, Volume 1, Lawyers Book Stall, Gauhati.

Chaube, S.K. (1999): Hill Politics in North East India, Orient Longman, Calcutta.

Nongkynrih, A.K. (2010): Scheduled Tribes and the Census: A Sociological Inquiry, in Economic and Political Weekly, XIV (19); 43-47.

Hazarika, Joysankar (1996): Geopolitics of North East India: A Strategical Study.

Sharma, Suresh Kant & Usha Sharma (2015): Discovery of North-East India: Geography, History,

Culture, Religion, Politics, Sociology, Science, Education and Economy. North-East India. Volume one, Volume 1, Mittal Publications.

Gopalakrishnan, Ramamoorthy [1991]: Political geography of India's North East, Har-Anand Publications in association with Vikas Pub. House.

Col Ved Prakash, (2006): Encyclopaedia of North-East India, Vol. 1.

T.Raatan (2004); "Various Ethnic Groups," Encyclopaedia of North- East India, Volume 3, Kalpaz Publications, Delhi- 110052, p 17.

Bhattcharyya, Narendra(2009): North East India: A Systematic Geography.

Semester- V

Paper VI: GE 502 MAP READING, RS, GIS AND SURVEYING (Honours)

Part A- TheoryCredits 2

Marks 50 (Internal: 12)

(In the end semester examination, students are to answer 4 questions out of 8, selecting one from each unit. Unit 1 & 2 carry 10 marks each and Unit 3 & 4 carry 9 marks each)

Unit-I: Map Reading (KN/IK)

(i) History of Map-making (ii) Types of Maps and their functions (iii) Map Reading Techniques: Concepts of point, line and area (iv) Map projections: Definition, Classification

Unit-II: Field Survey (IK)

(i) Importance of Field Study in Geography (ii) Field Techniques in data collection: Physical & Socioeconomic Survey (Household Schedule and Focused Group Discussion)

Unit-III: Remote Sensing (APN)

- (i) Definition, Nature and importance (ii) Historical background (iii) Basic Principles (iv) Components
- (v) Applications

Unit IV: GIS (APN)

- (i) Definition, Nature and importance (ii) Historical background (iii) Basic Principles (iv) Components
- (v) Applications

Part B- Practical

Credits 2

Marks 50 (Internal:12)

(4½ Hours)

(In the end semester examination students are to answer any 3 questions selecting at least 1 from each unit. The questions are of equal value, each question carrying 10 marks. The Viva-voce and Practical Notebook carries 4 marks each)

Unit I: Projections (IK)

(1) Zenitnal Gnomonic Projection (ii) Simple Conical Projection with Two Standard Parallels (iii) Cylindrical Equal Area Projection

Unit II: Surveying (PRL)

- (i) Plane Table Survey- Land survey to establish linear measurement (Radial method)
- (ii) Prismatic Compass: Open and Closed traverse survey
- (iii) Transit Theodolite: Preparation of contour maps

Unit II: Remote Sensing & Geographical Information System (PRL/APN)

- (i) Visual interpretation of land use and land cover mapping using aerial photo and satellite imagery
- (ii) Map digitization and co-ordinate registration using GIS software

UG Syllabus in Geography 2019

APW- A.P. Wargin

DDN - D.D. Neng

IK - I. Khan

Department of Geography Synod College, Shillong

Books on Projection:

Archer, J. E. and Dalton, T.H. (1968): Field Work in Geography, William Clowes and Sons Ltd., London.

Bolton, T. and Bewbury, P.A. (1968): Geography Through Fieldwork, Blandford Press, London. Bonham-Carter, G. (1994): Geographical Information System for Geoscientists: Modelling with GIS, Pergamon Press, Oxford.

Burrough, P. A. and McDonnell, R.A. (1998): Principles of Geographical Information System. Oxford University Press, Oxford.

Davis, B.E. (2001): GIS: A Visual Approach, Onward Press, Canada.

Decker, D. (2001): GIS: Data Sources, John Willey and sons, U.S.A.

Glemmer, G. (2010): GIS20: Essential Skills, ESRI Press, California.

Jones, P.A. (1968): Field Work in Geography, Longmans, Green and Company Ltd., London.

Karnetkar, T.P. and Kulkarni S.V. (1974, 1981): Surveying and levelling, Vol. I and II, Pune Vidyarthi Griha Prakashani, Pune.

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Lousenbury, J.F. and Aldrich, F.T. (1986): Introduction to Geography Field Methods and Techniques, Charles E. Merrill Publishing. Company, Colombus.

Malone, L. (2005): Mapping Our World: GIS Lessons for educators, ESRI Press, California

Misra, R. P. and Ramesh A. (2002): Fundamentals of Cartography, Concept Publishing House, New Delhi.

Monkhouse, F.J. and Wilkinson, H.R. (1989): Maps and Diagrams (Reprint), B.I. Publications, New Delhi.

Panigrahi, N. (2008): Geographical Information System, University Press, Bangalore.

Robinson, Arthur et al., (1978); Elements of Cartography, John Wiley and Sons, New York.

Sarkar, A. (1997): Practical Geography, Orient Longman, Kolkata

Shamsi, U.M. (2002): GIS Tools for Water, Wastewater and Storm water Systems, ASCE Press. USA.

Shuurman, N. (2004): GIS: A Short Introduction, Blackwell, U.K.

Singh, L.R. (2006): Fundamentals of Practical Geography, ShardaPustakBhawan, Allahabad.

Sinton, D.S. & Jennifer J. Lund (2007): Understanding Place: GIS and Mapping Across the Curriculum, ESRI Press, California.

Steingberg, S. J. and Steingberg, Sheila S. (2006): GIS: Geographical Information System for Investigating Space and Place, Sage Publications, London.

Stilwel, J. and Clarke, G.(2004): Applied GIS and Spatial Analysis, John Willey & Sons, USA.

Semester-VI Paper VII: GE 601 GEOGRAPHY OF RESOURCES

Theory Credits 4 Marks 100

(Internal: 25)

(In the End Semester Examination, students are to answer 5 questions out of 10, selecting 1 from each unit. The questions will be of equal value, carrying 15 marks each)

UNIT-I Basic Concepts(KN)

(i) Concept, Classification and Significance of Resources (ii) Concept of Human Resource (iii) Population Resource Relationship (Ackerman's) (iv) Concept of Human Development index

UNIT-II Biotic Resources (IK)

 Global distribution of Forest Resources (ii) Global distribution of marnie fishing: over fishing and consequences (iii) Global biodiversity& hot-spots

UNIT-III: Abiotic Resources (PRL)

 (i) Global distribution of Energy (Hydro, Atomic & Non-Conventional) (ii) Distribution of Ferrous (Iron ore, Bauxite, Copper) & Non-ferrous minerals (Limestone, Gypsum) (iii) Marine resources (excluding Fishing)

UNIT-IV: Resource, Environment and Development (APW)

(i) Environment -Development dilemma (ii) Territorial conflict in use of water resources (Indus & Cauvery)
 (iii) Environmental consequences of natural resource consumption: Pollution (air, water & land) and Global warming

UNIT- V: Resource Conservation (DDN)

(i) Global arable land, food resources and food security (ii) Principles of conservation: efficiency in uses, recycling & substitutions (iii) Concept of sustainability

References and Suggested Readings

Blanco, E. and Razzaque, J. (2011): Globilization and National Resources, Luw, Challenges, Key Issues and Perspective, Edward Elgar Publ., U.K.

Brundtiand, G.H. (1987): Our Common Future, UNCED Report, Geneva.

Cheng, L.O. (1983): Certificate Physical and Human Geography, Oxford Univ., Press, Oxford.

Coe, N., Kelly, P. and Yeung, H.W.C. (2007): Economic Geography: A Contemporary Introduction, John Wiley and Sons, New York.

Dicken, P. (2007): Global Shift: Mapping the changing contours of the world economy, Sage Publ., New York.

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Parman, S.S. (2002): Geography, Economics and Economic Geography, ASD Pub., Pune.

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Simmons, I.G. (1980): The Ecology of Natural Resources, Edward Arnold, London.

Simmons, I.G. (1991): Earth, Air and Water: Resources and Environment in the 20th Century, Edward Arnold, London.

Wiebe, K. (2003): Land Quality Agricultural productivity and Food Security, Edward Elgar, Publ., U.K.

UG Syllabus in Geography 2019
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APN-A.P. Warjui
ABN-D.D. Nengnan
IK-J. Kharbliki O
PRL-P. R. Camare

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Department of Geograph
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Paper VIII GE 602 (e): AGRICULTURAL GEOGRAPHY

Part A- Theory Credits 3 Marks 75 (Internal: 19)

(In the End Semester Examination, students are to answer 5 questions out of 10 selecting at least ONE from each unit. Unit 1 will carry 12 marks while the remaining units will carry 11 marks each)

Unit-I Fundamentals (IK)

 (i) Definition, nature and scope (ii) Approaches to the study of Agricultural Geography (behavioural, commodity, economic, regional, systematic and ecological)

Unit-II Origin and Diffusion of Agriculture (PRL)

(i) Origin and diffusion of agriculture: Carl Sauer's views (a) (ii) Physical, socio- economic and technological determinants of agriculture

Unit-III Agricultural Systems of the World (APW)

 (i) Agricultural systems of the world (Whittlesey's scheme): Shifting cultivation, intensive and extensive agriculture, commercial grazing, plantation agriculture and truck farming (horticulture)

Unit-IV Distribution and Pattern of Indian Agriculture (Kハ)

(i) Bases of agricultural regionalization: crop concentration, crop combination, crop diversification
 (ii) Distribution and characteristics of agro-climatic regions (iii) Production and productivity of the major food crops (iii) Food surplus and deficit areas and associated problems

Unit-V Indian Agriculture: Characteristics and Issues (DON)

(i) Green Revolution and recent development in Indian agriculture (ii) Agricultural development in North-East India: Problems and Prospects

Part B- Project

Credit 1

Marks 25 (Internal: 6)

(The Topic of the project is to be related the optional paper of the student. Students are to conduct an independent research (study) of a small areal unit (village/town/ town ward/wards etc) from their respective district and are to collect necessary primary and secondary data. The data generated are to be used for preparation of the Project report using suitable cartographic, statistical, RS and GIS techniques where ever necessary)

(Mark distribution – 14 marks for Project Report and 5 marks for Viva-voce)

UG Syllabus in Geography 2019

Jeachers Lucials: KN: K. Nongrum

APW: A.P Navyri

DAN: D. D. Nengnong IK: I. Kharbilki

PRL: P. R. Kamare

Page 25 Head June

Synod College, Shillong

Anderson, E. (1970): Geography of Agriculture, W.M. C. Brown Co, Iowa.

Bayliss Smith, T. P. (1987): The Ecology of Agricultural Systems, Cambridge University Press,

Berkry, B. J. L. et al., (1967): The Geography of Economic Systems. Prentice Hall, New York.

Dyson, T. (1996): Population and Food- Global Trends and Future Prospects, Routledge, London.

Gregor, H. P. (1970): Geography of Agriculture. Prentice-Hall, New York.

Grigg, D.B. (1974): The Agricultural Systems of the World, Cambridge University Press, New York.

Husain, M. (1996): Systematic Agricultural Geography Rawat Publications, Jaipur.

Mishra, R. P. (1967): Diffusion of Agricultural Innovations, University of Mysore, Mysore.

Mohammad, A. (1978): Studies in Agricultural Geography, Rajesh Publications, New Delhi.

Morgan, W. B. and Norton, R.J.C. (1971): Agricultural Geography. Methuen, London.

Sauer, O. C. (1969): Agricultural Origins and Dispersals. MIT Press, Cambridge.

Sen, S. (1975): Reaping the Green Revolution. Tata McGraw-Hill, New Delhi.

Shafi, M. (2000): Agricultural Geography of South Asia, McMillan, Delhi

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Singh, J. and Dhillon, S.S. (2000): Agricultural Geography. Tata McGraw Hill, New Delhi.

Singh, S. (1994): Agricultural Development in India: A Regional Analysis, Kaushal Publ., Shillong.

Singh, J. et al., (1984): Agricultural Geography, TataMcGrawhil1, New Delhi.

Symon, L. (1968): Agricultural Geography, George Bell and Sons, London.

Tanant, J.R. (1974): Agricultural Geography, David & Charles, Newton.

The following are the teaching methods adopted by the department Khasi Department Teaching Methods

1. Lecture Method

Definition:

method, where the teachers prepared lectures for the classes concerned and delivered to the student for a period of 35-40 minutes. The students are expected to jot down the important points. After the lecture is over the students are allowed to seek clarification Most of the classes are done by lecture on any doubt

Aims:

The main aims is to develop the cognitive domain of the students. In order to achieve the said aim the following objectives are followed

- 1. To deliver the sub-topic and topic of the syllabus.
- To enhance the student's understanding of the subject concerned
 - 3. To enable the student to apply the knowledge acquired.

When to use

It is used by lecturing and demonstrating on the board. The lecture method is supported by using ICT depending on the topic.

Implementation.

The lecture method is a teacher based learning technique. The teachers used the method according to the syllabus, to impart the knowledge to the students. To make the method more effective is supported by using ICT and other teaching aids

2. Group discussion:

Here the teacher engages the class through discussion by breaking up a group of students engaging a small class in a guided exchange of ideas, experiences responses etc., to reach an understanding of the study material,

Objectives:

- To encourage student's participation
- 2. To encourage students to think creatively

When to use it

- It is used by breaking up the group of students into smaller number (5 to
 - Asking the group of students to discuss on the topic, assigned to them
- Relevant ideas and opinions of the different groups were taken to solve the problems
 - ICT were used during the session

Implementation:

Discussion method is a student based learning techniques. The teacher assigned the topic to the students for group discussion according to the syllabus. This is done to enhance the knowledge and confident among the students.

- Studylecturenotes.com/education.
- En.M.wikipedia.org/wiki/Lecture
- Lubpages.com/education/group-discussion

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Department of Khasi, ynod College, Shillong Head,

Khasi Department Teaching Methods

The following are the teaching methods adopted by the department

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When to use it

- It is used by breaking up the group of students into smaller number (5 to
 - Asking the group of students to discuss on the topic, assigned to them
- Relevant ideas and opinions of the different groups were taken to solve the problems
 - ICT were used during the session

Implementation:

Discussion method is a student based learning techniques. The teacher assigned the topic to the students for group discussion according to the syllabus. This is done to enhance the knowledge and confident among the students.

- Studylecturenotes.com/education.
- En.M.wikipedia.org/wiki/Lecture
- Lubpages.com/education/group-discussion

Signature of the Hod

Department of Khasi

Department of Khasi, ynod College, Shillong Head,

NAME OF THE TEACHERS AND BOOKS ASSIGNED 2017 - 2018

1st Semester Paper I

Mrs. B. Raplang: "Ka Tynrai ka ksaw ka kpong" from Ka Ksaw ka

Kpong u Hynniewtrep - D. T. Laloo

Mrs. C. Pariat: U Khasi bad ki khanatang I, II, III chapter 17, 18, 19

from Ka Pyrkhat u Khasi - H.O Mawrie

Ms. D. Syiem: i) Ki Mawbynna ii) Ki Jait syiem jait lyngdoh

Ka Niam Khasi - H. Lyngdoh

Dr. W. M. Kharryngki: "Shaphang ka jingiapoi kha" Lynnong II from Ka

Niam Jong ki Khasi - Jeebon Roy

Mr. T. Lynshiang: "Ka Bishar Khasi" from Ka Riti jong ka Ri Laiphew

Sylem bynta II G. Costa.

2nd Semester Paper II

Mrs B. Raplang: Ka jingroi jingsan ka Drama Khasi naduh u H. C. Roy

(1910) haduh u H. Mylliemngap (1980)

Ms. D. Syiem: Ka jingroi jingsan ka Parom (fiction) khasi naduh u H.

C Roy (1915) haduh u L.H. Pde (1980)

Dr. W. M Kharryngki: Ka jingroi jingsan ka Prose Khasi naduh u Jeebon Roy

(1900-1980)

Dr. T. Lynshiang: Ka jingroi jingsan ka Poitri Khasi naduh u Soso Tham

(1925) naduh u H. W. Sten (1980)

3rd Semester Paper III

Mrs. B. Raplang: Ka Jingpule Shaphang ka Ktien M. B. Jyrwa

Chapter V

Ms. D. Syiem: Ki Verb Khasi - H. Marwein Chapter I, II

Dr. W. M. Kharrngki: Ki Sawa bad ki Dur Kyntien jong ka Ktien Khasi - B.

War

Mr. T. Lynshiang: Shaphang ka Ktien - H. W. Sten Chapter III, JV, VI,

IX

4th Semester Paper IV

Mrs. B. Raplang: "Ha ki nongpule" from Ka Sawangka la ki Saw Ngut

Ba Iap Mynsaw - F. M. Pugh

Ms. D. Syiem: Shaphang ka Novel - H. W. Sten

Dr. W. M. Kharyngki: "Ka pyrla halor ka jingbishar bniah" from Ka Thew ka

Woh ia ka Jingbishar Bniah halor ka Novel Khasi -

D.R.L Nonglait

Mr. T. Lynshiang: "Shaphang ka poitri " from Ka Hamsaia ki Por -

H.Elias

5th Semester Paper V (Khasi Drama)

Mrs. B. Raplang: URaikut - S. Dkhar

Mrs C. Pariat: U Baieit Donskhor - D. S. Khongdup

Ms. D. Syiem: Ka Mahadei - H. W. Sten

Dr. W. M. Kharryngki: Ka Rangli - H. Mylliemngap

5th Semester Paper VI (Khasi fiction)

Mrs B. Raplang: Ki Palong ka Jingbiej - S. Synrem

Ms. D. Syiem: Kam Kalbut - W. Teiwsoh

Dr. W. M. Kharryngki: Ka Jingieit ba Nylla - F.S Lyngdoh

Mr. T. Synshiang: Ka Samla Nongkyndong - H. W. Sten

6th Semester Paper VII (Literature in Translation)

Mrs. B. Raplang: "U John Gilpin" from Ka Duitara Ksiar - Soso Tham

Ms. D. Syiem: U Androklis bad u Sing S. J. Duncan

Dr. W. M. Kharryngki: Ka Jingiaid u Pilgrim - John Roberts

Mr. T. Lynshiang: "Ka Jingiam Briew ha u Lum Jingtep lingmane" from

Ka Ryngkap - Morkha Jospeh

6th Semester Paper VIII (Khasi poetry)

Mrs B. Raplang: (i) "U syntiew ba nga jied" Na Lum Khasi - D. S.

Khongdup

(ii) "Ithakemen" Na Thiar ki Longshawa.

Ms. D. Syiem: Ka Buron Ba La Jah bynta II - H. W. Sten

Dr. W. M. Kharryngki: (i) "Ki sngi u Hynniewtrep" Ka Duitara Ksiar - Soso

Tham.

(ii) "Ka Sohlyngngem" - Jutang Ka Sur Pangnud u

Khun Khasi-O. M. Wahlang

Mr. T. Lynshiang: (i) (a) "Ka jingphawar shadwait"

(b) Ka jingphawar lasiat thong - Kitab Jingphawar -

Rabon Singh

ii) "Ko Duitara jong nga" Ki Poetry Khasi - V. G.

Bareh

BA 4th Semester Khasi MIL

Mrs B. Raplang: "U sim bala lait" Ka Duitara Ksiar - Soso Tham

Ms. D. Syiem: (i) "Ki mad ia ka Shillong" from Phuit ka Sabuit bad

Kiwei de ki Khana - S. J. Duntam

(ii) "U Nonghikai nongkyndong" from Shikti na

Thwei Mudur - I. M. Simon

Dr. W. M. Kharryngki: Ka Drama u Tirot Sing - V. G. Bareh

Mr T. Lynshiang: (i) "Akor khasi" from Na Sla Ka Sohmyndur - S.

Rynjah

(ii) "Lum Maloi khlieh" from Ka Phawer Ksan

Rngiew - S S Majaw

B.Com 4th Semester Khasi MIL

Mrs. B. Raplang:

U Mooiang - L. H. Pde

Ms. D. Syiem:

(i) Ka Jingbymneh Spah bad ka Khein Jait - K.

Rapthap

(ii) Ka Spah Bym Ju Rngad - K. D. Kharkongor

Dr. W. M. Kharryngki:

Ka tbit thoh ha ki kam ki jam

(i) Ka rukom thoh shithi

(ii) Ka rukom thoh kaiphod

Mr. T. Lynshiang:

(i) Ka Trei ka Ktah ha Ri Khasi - S. Rynjah

(ii) Na ki Sawkun ka Mariang - S. Dkhar

Name of the teachers and the books Assignment 2019-2020

1st Semester Paper - 1

Ms. D. Syiem:

(i) Ki mawbynna

(ii) Ki jait syiem jait lyngdoh from Ka Niam Khasi -

H. Lyngdoh

Dr. W. M. Kharryngki:

"Shaphang ka jingiapoikha" Lynnong II from Ka

Niam Jong ki Khasi - Jechon Roy

Mr. E. Kharpan:

U khasi bad ki khanatang I. II, III chapter 17, 18, 19

from Ka Pyrkhat u Khasi - H. O. Mawrie

Mr. T. Lynshiang:

"Ka bishar khasi" from Ka Riti Jong ka Ri Laiphew

Sylem bynta II - G. Costa

Dr (Mrs) J. Sawkmie:

"Ka tynrai ka ksaw ka kpong" from Ka Ksaw ka

Kpong u Hynniew Trep - D. T. Laloo

2nd Semester Paper II

Ms. D. Syiem:

Ka jingroi jingsan ka Parom (fiction) khasi naduh u H.

C. Roy (1915) haduh u L. H Pde (1980)

Dr W. M. Kharrynki:

Ka jingroi jingsan ka Prose khasi naduh u Jeebon Roy

(1900-1980)

Mr. E. Kharpan:

Ka history ka thoh ka tar bynta II - R. S. Lyngdoh

Mr. T. Lynshiang:

Ka jingroi jingsan ki Poitri khasi naduh u Soso Tham

(1925) haduh u H. W. Sten (1980)

Dr (Mrs) J. Sawkmie:

Ka jingroi jingsan ka Drama khasi naduh u H. C. Roy

(1910) haduh u H. Mylliemngap (1980)

3rd Semester Paper III

Ms. D. Syiem:

Ki Verb Khasi - H. Marwein Chapter I, II

Dr. W. M. Kharrngki:

Ki Sawa bad ki Dur Kyntien jong ka Ktien Khasi - B.

War

Mr E. Kharpan: Ka Jingpule Shaphang ka Ktien - M. B. Jyrwa

Chapter V

Mr. T. Lynshiang: Shophang ka Ktien - H. W. Sten Chapter HI, IV, VI.

IX

4th Semester Paper IV

Ms. D. Syiem: Shaphang ka Novel - H. W. Sten. Lynnong 1,2, &3.

Dr. W. M. Kharyngki: "Ka pyrla halor ka jingbishar bniah" from Ka Thew ka

Woh ia ka Jingbishar Bniah halor ka Novel Khasi -

D.R.L Nonglait

Mr. E. Kharpan: Shaphang ka Novel - H. W. Sten. Lynnong 4& 5.

Mr. T. Lynshiang: "Shaphang ka poitri "from Ka Hamsaia ki Por -

H.Elias

Dr (Mrs) J. Sawkmie: Ha ki nongpule "From Ka Sawangka ia ki Sawngul

Ba iap Mynsaw

5th Semester Paper V (Khasi Drama)

Dr. W. M. Kharryngki: URaikut - S Dkhar

Mr. E. Kharpan: Ka Mahadei - H. W. Sten

Dr (Mrs) J. Sawkmie: U Baieit Donskhor - D. S. Khongdup

Mr T. Lynshiang: Ka Rangli - H. Mylliemngap

5th Semester Paper VI (Khasi fiction)

Ms D. Syiem: Kam Kalbut - W. Tiewsoh

Dr. W. M. Kharryngki: Ka Jingieit ba Nylla - F. S. Lyngdoh

Mr. E. Kharpan: Ki Palong ka Jingbiej - S. Synrem

Dr (Mrs) J. Sawkmie: Ka Samla Nongkyndong H. W. Sten

6th Semester Paper VII Literature in Translation

Ms. D. Syiem:

U Androklis bad u Sing - S. J. Duncan

Mr E. Kharpan:

Ka jingiaid u Pilgrim - John Roberts

Mr. T. Lynshiang:

"Ka jingiam briew ha u lum jingtep Ingmane "from

Ka Ryngkap - Morkha Joseph

Dr (Mrs) J. Sawkmie:

"U John Gilpin" from Ka Duitara Ksiar - Soso Tham

6th Semester Paper VIII (Khasi Poetry)

Ms. D. Syiem:

Ka Burom Ba La Jah Bynta II - H. W. Sten

Dr W. M. Kharryngki:

(i) Ki sngi u Hynniewtrep from Ka Duitara Ksiar -

Soso Tham

(ii) "Ka Sohlyngngem" from Jutang ka Sur Pangnud u

Khun Khasi - O. M. Wahlang

Mr T. Lynshiang:

(a) Ka jingphawar shad wait

(b) Ka jingphawar iasiat thong from Ka Kitab

Jingphawar - Rabon Singh

Dr (Mrs) J. Sawkmie:

(i) "Ithakemon" from Ka Thiar ki Longshwa

(ii) "U syntiew ba nga jied" from Na Lum Khasi - D.

S. Khongdup

BA 4th Semester Khasi MIL

Ms. D. Syiem:

"Ki mad ia ka Shillong" from Phuit ka Sabuit bad

Kiwei ki Khana - S. J. Duncan

Dr. W. M. Kharryngki:

Ka Drama U Tirot Sing - V. G. Bareh

Mr. E. Kharpan:

"U Nonghikai Nongkyndong" from Shikhi na Thwei

Mutdur-1.M. Simon

Dr (Mrs) J. Sawkmie:

"Akor Khasi" from Na Sla ka Sohmyndur - S. Rynjah

Mr. T. Lynshiang:

(i) "U sim ba la lait" from Ka Duitara Ksiar - Soso "

Tham

(ii) "Lum maloi khlich" from Ka Phawer Ksan Rngiew - S. S. Majaw

B Com 4th Semester khasi MIL

Ms. D. Syiem:

(i) Ka Jingbymneh Spah bad ka Khein Jait - K.

Rapthap

(ii) Ka Spah Bym Ju Rngad - K. D. Kharkongor

Dr. W. M. Kharryngki:

(i) Ka Trei ka Ktah ha Ri Khasi - S. Rynjah

Mr E. Kharpan:

Ka tbit thoh ha ki kam ki jam

(i) Ka rukom thoh shithi

(ii) Ka rukom thoh kaiphod

Mr. T. Lynshiang:

Na ki Sawkun ka Mariang - S. Dkhar

Dr (Mrs) J. Sawkmie:

U Moolong - L. H Pde

NAME OF THE TEACHERS AND THE BOOKS ASSIGNED W.E.F 2021

1st Semester Paper I

Ms. D. Syiem:

(i) "Ka Mawbynna"

(ii) "Ki jait syiem jait lyngdoh" from Ka Niam Khasi -

H. Lyngdoh

Dr. W. M. Kharryngki:

"Shaphang ka jingiapoikha" lynnong II from Ka Niam

Jong ki Khasi - Jeebon Roy

Mr. E. Kharpan:

"U khasi bad ki khanatang" I, II, III chapter 17, 18, 19

from Ka Pyrkhat u Khasi - H. O. Mawrie

Mrs B. Jana:

"Ka tynrai ka ksaw ka kpong" from Ka Ksaw ka

Kpong u Hynniew Trep - D. T. Laloo

Mr. T. Lynshiang:

"Ka Bishar Khasi" from Ka Riti Jong ka Ri Loiphew

Syiem Bynta II - G. Costa

2nd Semester Paper II

Ms. D. Syiem:

Ka jingroi jingsan ka Parom (fiction) khasi naduh u

H.C. Roy (1915) haduh u L. H. Pde (1980)

Dr. W. M. Kharryngki:

Ka jingroi jingsan ka Prose khasi naduh u Jeebon Roy

(1900-1980)

Mr. E. Kharpan:

Ka history ka thoh ka tar bynta II - R. S. Lyngdoh

Mrs. B. Jana:

Ka jingroi jingsan ka Drama khasi naduh u H. C. Roy

(1910) haduh u H. Mylliemngap (1980)

Mr. T. Lynshiang:

Ka jingroi jingsan ka Poitri khasi nadoh u Soso Tham

(1925) haduh u H. W. Sten (1980)

3rd Semester paper III

Ms. D. Syiem:

Ki Verb Khasi- H. Marwein. Chapter I, II

Dr. W. M. Kharryngki:

Ki Sawa bad ki Dur Kyntien Jong ka Ktien Khasi - B

War (i) Bynta II

(ii) Bynta III, lynnong XII, XIII, XIV, XV

Mr. E. Kharpan; Ki Sawa bad ki Dur Kyntien Jong ka Ktien Khasi – B.

War (i) Bynta 1

(ii) Bynta III lynnong IX, X, XI

Mrs. B. Jana: Ka Jingpule Shaphang ka Ktien. M. B. Jyrwa chapter

V

Mr. T. Lynshiang: Shaphang ka Ktien - H. W. Sten

Chapter III, IV, VI, IX

4th Semester paper IV

Ms. D. Syiem: Shaphang ka Novel - H. W. Sten chapter I, II, VI

Dr. W. M. Kharryngki: "Ka pyrla halor ka jingbishar bniah" from Ka Thew ka

Woh ia ka Jingbishar Bniah halor ka Novel Khasi -

D. R. L Nonglait

Mr. E. Kharpan: Shaphang ka Novel - H. W. Sten chapter III, IV, V

Mrs. B. Jana: "Ha ki nongpule" from Ka Sawangka ia ki Sawngut

Ba iap Mynsaw - F. M. Pugh

Mr. T. Lyngshiang: "Shaphang ka Poitri" from Ka Hamsaia ki Por H. Elias

5th Semester paper V (Khasi Drama)

Dr. W. M. Kharryngki: U Raikut - S. Dkhar

Mr. E. Kharpan: Ka Mahadei - H. W. Sten

Mrs B. Jana: U Baieit Donskhor -- D. S. Khongdup

Mr. T. Lynshiang: Ka Rangli - H. Mylliemngap

5th Semester paper VI (khasi fiction)

Ms. D. Syiem: Kam Kalbut - W. Tiewsoh

Dr. W. M. Kharryngki: Ka Jingieit ba Nylla - F. S. Lyngdoh

Mr. E. Kharpan: Ki Palong ka Jingbiej - S Synrem

Mrs B. Jana:

Ka Samla Nongkyndong - H. W. Sten

6th Semester paper VII (Literature in Translation)

Ms. D. Syiem: U Androklis bad u Sing - S. J. Duncan

Mr. E. Kharpan: Ka Jingiaid u Pilgrim – John Roberts

Mrs. B. Jana: "U John Gilpin" from Ka Duitara Kstar - Soso Tham

Mr.T. Lynshiang: "Ka jingiam briew ha a Lum jingtep Ingmane" from

Ka Ryngkap - Morkha Joseph

6th Semester paper VIII (Khasi poetry)

Ms. D. Syiem: Ka Burom Ba La Jah II - H. W. Sten

Dr. W. M. Kharrynki: (i) "Ki sngi u Hynniew Trep" from Ka Duitara Ksiar

- Soso Tham

(ii) "Ka sohlyngngem" from Ka Jutang ki Sur

Pangnud u Khun Khasi - O. M. Wahlang

Mr. E. Kharpan: "Ko Duitara jong nga" Ki Poetry Khasi - V. G. Bareh

Mrs B. Jana: (i) "Ithakemon" from Na ka Thiar ki Longshiova

(ii) U syntiew banga jied from Na Lum Khasi - D. S.

Khongdup

Mr. T. Lynshiang: (a) Ka jing phawar shadwait

(b) Ka jingphawar iasiat thong from Ka Kitab

Jingphawar - Rabon Singh

B.A 4th Semester Khasi MIL

Ms. D. Syiem: Ki Mad ia ka Shillong from Phuit ka Sabuit bad Kiwei

de ki Khana S. J. Duncan

Dr. W. M. Kharryngki: Ka Drama u Tirot Sing - V. G. Bareh

Mr. E. Kharpan: "U Nonghikai Nongkyndong" Shikti na Thwei Mutdur

- I. M. Simon

Mrs. B. Jana:

"Akor Khasi" - Na Sla ka Sohmyndur - S. Rynjah

Mr. T. Lynshiang:

(i) "U Sim ba la lait" - Ka Duitara Ksiar - Soso tham

(ii) "Lum Maloi Khlieh" - Ka Phawer Ksan Rugiew -

S. S. Majaw

B.Com 4th Semester Khasi MIL

Ms. D. Syiem:

(i) Ka Jingbymneh Spah bad ka Khein Jait - K.

Rapthap

(ii) Ka Spah Bym Ju Rugad - K. D. Kharkongor

Dr. W. M. Kharryngki:

Ka Trei ka Kiah ha Ri Khasi - S. Rynjah

Mr E. Kharpan:

Ka tbit thoh ha ki kam ki jam

(i) Rukom thoh shithi

(ii) Rukom thoh kaiphod

Ms. B. Jana:

U Mooiong - L. H. Pde

Mr. T. Lynshiang:

Na ki Sawkun ka Mariang - S. Dkhar

Signature of the Hod

Department of Khasi

Head, Department of Khasi, Synod College, Shillenia

TEACHING METHODS ADOPTED IN THE DEPARTMENT OF BOTANY

- Lecture method The most commonly used method in which the teacher works as sole-resource in classroom instruction. This method is accompanied by different teaching aids such as blackboard/whiteboard, charts, models, power point presentations, OHP, specimens (live and preserved), etc.
- Question-Answer method This method is an attempt to evaluate the knowledge of students with regards to the subject. It is also a method of transferring messages by asking questions and students give an answer or otherwise students are given the opportunity to ask and answer the question of teachers.
- Group discussion method—It is a group activity involving the teacher and students to define the problem and seek its solution. It is a constructive process which involves listening, thinking and speaking ability of the students.
- 4. Demonstration method It is one of the most versatile and useful methods of teaching science. The purpose of this method is to keep the students interested and motivated by introducing a lesson with an interesting experiment. It also provides means for clarifying experimentally certain parts of the subjects as done in the laboratory.
- Laboratory/Experimental teaching method This is an important method where the teachers encourage the students to make biological, chemical and physical phenomena more real through actual experiences and to make accurate observations and careful recordings using lab equipments and instruments.
- Assignment method It is type of self-study method which supplements classroom teaching, where teacher assigns works, provides guidelines and sets time limits for the completion of assignment. It is an instructional technique comprising guided information, self-learning, writing skills and report preparation among the learners.
- Seminar method A seminar is an instructional technique which involves generating
 a situation for a group to have guided interaction among themselves on different
 aspects or components of a topic and which is generally presented by one or more
 members.
- Open-book test In this method, students are allowed to refer to either class-notes or text books for answering questions. It helps in evaluating the student's ability to find and apply information and knowledge. Thus, encouraging high order thinking skills in students.

Innovative Methods:

 Project method – Project method attempts to allow the students to solve problems with as little direction as possible. The teacher is seen more as a facilitator than a deliverer of knowledge and information. It takes the students beyond the walls of the classroom and it encourages investigative learning and solution of practical problems. It promotes a better knowledge of the practical knowledge gained from books. It encourages the spirit of research in the students.

 Field trip/Educational tour method – Field trips provide students first-hand experiences that cannot be achieved in the classroom. Field trips are a great way to bring excitement and adventure to learning and to expand students' horizons and allow them to learn experientially.

Department of Botany, Synod College, Shitlong

Synod College

Shillong

Distribution of course content: -

1st Semester

Paper 1(Theory) - Algae, Bryophytes and Pteridophytes

2017 and 2018

Unit I	F. S. Khonglah	
Unit II	N. C. Marbaniang	
Unit III	H. Swer	
Unit IV	S. Jyrwa	

2019

Unit I	F. S. Khonglah
Unit II	N. C. Marbaniang
Unit III	H. Swer & B.R. Suchiang
Unit IV	S. Jyrwa & B.R. Suchiang

2020

Unit I	Dr. P. Nongkling
Unit II	N. C. Marbaniang
Unit III	H. Swer & B.R. Suchiang
Unit IV	S. Jyrwa & B.R. Suchiang

2021

Unit I	Dr. P. Nongkling
Unit II	N. C. Marbaniang
Unit III	Dr. H. Swer
Unit IV	S. Jyrwa & Dr. Y. Saio

Paper I (Practical) - All Teachers

Department of Botany, Synod College, Shifting,

Synod College Shillong

Distribution of course content: -

2nd Semester

Paper II (Theory) - Gymnosperm, Paleobotany, Morphology and Anatomy

2017 and 2018

Unit I	F. S. Khonglah	
Unit II	H. Swer	
Unit III	B.Wankhar	
Unit IV	N.C. Marbaniang	

2019

Unit I	F. S. Khonglah	
Unit II	H. Swer	
Unit III	B.R. Suchiang	
Unit IV	N.C. Marbaniang	

2020

Unit I	P. Nongkling	
Unit II	H. Swer	
Unit III	B.R. Suchiang	
Unit IV	N.C. Marbaniang	

2021

Unit I	D N	
Printed Contractions and Contraction of Contraction	P. Nongkling	4
Unit II	H. Swer	
Unit III	Y. Saio	
Unit IV	N.C. Marbaniang	

2022

Unit I	P. Nongkling	
Unit II	H. Swer	
Unit III	Y. Saio	
Unit IV	N.C. Marbaniang	

Paper II (Practicals) - All Teachers

Head, Department of Botany, Synod College, Shilling

Department of Botany Synod College

Shillong

Distribution of course content: -

3rd Semester

Paper III (Theory) - Angiosperm taxonomy, Economic Botany, Ethnobotany and Phytogeography

2017-2018

Unit I	F. S. Khonglah
Unit II	B. Wankhar
Unit III	
Unit IV	S. Jyrwa & H. Swer
	N.C. Marbaniang

2019

Unit I	F. S. Khonglah
Unit II	H. Swer
Unit III	S. Jyrwa & B. R. Suchiang
Unit IV	N.C. Marbaniang

2020

Unit I	P. Nongkling
Unit II	H. Swer
Unit III	S. Jyrwa & B. R. Suchiang
Unit IV	N.C. Marbaniang

2021

Unit I	P. Nongkling
Unit II	H. Swer
Unit III	S. Jyrwa & Y. Saio
Unit IV	N.C. Marbaniang

Paper III (Practical) - All Teachers

Head, Department of Botany, Syrod College, Shilleng.

Synod College Shillong

Distribution of course content: -

4th Semester

Paper IV (Theory) - Microbiology, Mycology and Plant Pathology

2017 and 2018

Unit I	II. Swer	
Unit II	S. Jyrwa & B. Wankhar	
Unit III	F. S. Khonglah	
Unit IV	N.C. Marbaniang	

2019

Unit I	H. Swer
Unit II	S. Jyrwa & B. R. Suchiang
Unit III	F. S. Khonglah
Unit IV	N.C. Marbaniang

2020

Unit I	H. Swer
Unit II	S. Jyrwa & B. R. Suchiang
Unit III	P. Nongkling
Unit IV	N.C. Marbaniang

2021

Unit I	H. Swer	- 1233
Unit II	Y. Saio	
Unit III	P. Nongkling	
Unit IV	N.C. Marbaniang	

2022

Unit I	H. Swer	
Unit II	Y. Saio	
Unit III	P. Nongkling	
Unit IV	N.C. Marbaniang	

Paper IV (Practical) - All Teachers

Head. Department of Botany, Syroid College, Shilling

Synod College Shillong

Distribution of course content: -

5th Semester

Paper V (Theory) - Plant physiology and Biochemistry

2017 and 2018

Unit I	F.S. Khonglah
Unit II	S. Jyrwa & B. Wankhar
Unit III	N. C. Marbaniang
Unit IV	S. Jyrwa & H. Swer

2019

Unit I	F.S. Khonglah
Unit II	S. Jyrwa & B.R. Suchiang
Unit III	N. C. Marbaniang
Unit IV	S. Jyrwa & H. Swer

2020

Unit I	P. Nongkling
Unit II	S. Jyrwa & B.R. Suchiang
Unit III	N. C. Marbaniang
Unit IV	S. Jyrwa & H. Swer

2021

Unit I	P. Nongkling	
Unit II	S. Jyrwa & Y.Sajo	_
Unit III	N. C. Marbaniang	
Unit IV	S. Jyrwa & H. Swer	

Paper V (Practical) - F. S. Khonglah, S. Jyrwa, H. Swer and P. Nongkling

Heart, Department of Botany, Synod Col.

Synod College Shillong

Distribution of course content: -

5th Semester

Paper VI (Theory) - Ecology and Conservation Biology

2017 and 2018

Unit I	F. S. Khonglah
Unit II	N. C. Marbaniang
Unit III	H. Swer
Unit IV	B. Wankhar

2019

Unit I	F. S. Khonglah
Unit II	N. C. Marbaniang
Unit III	H. Swer
Unit IV	B. R. Suchiang

2020

Unit I	P. Nongkling	
Unit II	N. C. Marbaniang	
Unit III	H. Swer	
Unit IV	B. R. Suchiang	

2021

P. Nongkling
N. C. Marbaniang
H. Swer
Y. Saio

Paper VI (Practical) - B. Wankhar and H. Swer

Head. Department of Botany. Synod College Grating

Department of Botany Synod College Shillong

Distribution of course content: -

6th Semester

Paper VII (Theory) - Genetics, Plant Breeding and Molecular Biology

2017 and 2018

Unit I Unit II	B. Wankhar
Unit III	N. C. Marbaniang
Unit IV	F. S. Khonglah
	S. Jyrwa

2019

Unit I	B. R. Suchiang
Unit II	
Unit III	N. C. Marbaniang
The state of the s	F. S. Khonglah
Unit IV	S. Jyrwa

2020

Unit I	B. R. Suchiang
Unit II	
Unit III	N. C. Marbaniang
	P. Nongkling
Unit IV	S. Jyrwa

2021

Unit I	Y. Saio
Unit II	N. C. Marbaniang
Unit III	P. Nongkling
Unit IV	S. Jyrwa

2022

Unit I	Y. Sajo
Unit II	N. C. Marbaniang
Unit III	P. Nongkling
Unit IV	P. Nongkling

Paper VII (Practical) - F.S. Khonglah, N. C. Marbaniang and P. Nongkling

Department of Botany, Synod College, Shitleng.

Department of Botany Synod College Shillong

Distribution of course content: -

6th Semester

Paper VIII (Theory) - Plant reproductive biology and Plant Biotechnology

2017, 2018 and 2019

Unit I	N. C. Marbaniang	
Unit II	N. C. Marbaniang	
Unit III	H. Swer	
Unit IV	F. S. Khonglah	

2020 and 2021

Unit I	N. C. Marbaniang	
Unit II	N. C. Marbaniang	
Unit III	H. Swer	
Unit IV	H. Swer	

2022

Unit I	N. C. Marbaniang	
Unit II	N. C. Marbaniang	
Unit III	H. Swer	
Unit IV	H. Swer	

Paper VIII (Practical) - B. Wankhar, S. Jyrwa and H. Swer

Head, Department of Botany, Synod College, Shitloon To,

The Coordinator, IQAC, Synod College, Shillong.

Subject: Teaching Methods.

Dear Madam,

I would like to submit here with the teaching methods used by the faculty members of the Department of Chemistry. The following are the methods used by the faculty members of the Department of Chemistry in the classroom.

- 1. LCD Projector
- 2. Group discussion
- 3. Use of ball and stick models
- 4. Students enactment
- 5. Asking questions relating to the topic on discussion
- 6. Seminars
- 7. Class test
- 8. Assignment
- 9. Projects
- 10. Study tour
- 11. Remedial course

Thanking you,

W. Khanmous phland Dr. W. Khannawphland HOD Chemistry

PROPOSED STRUCTURE & MARKS DISTRIBUTION FOR THE NEW B.Sc. PROGRAMME IN CHEMISTRY (NEHU) (ONLY CHEMISTRY PAPERS MENTIONED)

First Semester Total: 100 Marks

Chem EH 101: Part A Inorganic, Organic & Physical Theory – 75 marks Total: 100 marks

Part B Practical (Organic - Elective) – 25 marks

Chem H 101: Practical (Organic - Honors) – 25 marks

(Chem EH 101 is both *Honors* and *Elective*; Chem H 101 is purely *Honors*)

Second Semester Total: 100 Marks

Chem EH 201: Part A Inorganic, Organic & Physical Theory – 75 marks Total: 100 marks

Part B Practical (Physical) – 25 marks

Third Semester Total: 100 Marks

Chem EH 301: Part A Inorganic, Organic & Physical Theory – 75 marks Total: 100 marks

Part B Practical (Inorganic-I) – 25 marks

Fourth Semester Total: 100 Marks

Chem EH 401: Part A Inorganic, Organic & Physical Theory – 75 marks Total: 100 marks

Part B Practical (Inorganic-II) – 25 marks

Fifth Semester Total: 200 Marks

Chem H 501: Part A Inorganic Theory – 50 marks Total: 100 marks

Part B Organic Theory – 50 marks

Chem H 502: Part A Physical Theory – 50 marks Total: 100 marks

Part B Practical (Organic) - 25 marks
Part C Practical (Physical) - 25 marks

Sixth Semester Total: 200 Marks

Chem H 601: Part A Inorganic Theory – 50 marks Total: 100 marks

Part B Organic Theory – 50 marks

Chem H 602: Part A Physical Theory – 50 marks Total: 100 marks

Part B Practical (Inorganic) – 35 marks
Part C Seminar – 15 marks

Note: H stands for Honors alone; E stands for Elective alone; EH stands for both Elective and Honors. The above assignments of Course Numbers (e.g. Chem E 201) is only tentative

First Semester Total: 100 Marks

Chem EH 101 1:3 ratio

PART A Inorganic, Organic & Physical Theory

75 marks (19:56)

Section 1 (Inorganic)

19 Marks

Unit I 9½ marks

- (a) **Structure of Atom**: Limitations of Bohr's atomic model; idea of the de Broglie matter waves, Heisenberg's uncertainty principle; Schrodinger's wave equation and its importance; quantum numbers; concept of wave function; physical concepts of Ψ and Ψ^2 ; radial and angular wave functions; shapes of s, p and d-orbitals, Aufbau principle, Pauli's Exclusion Principle, Hund's rule, electronic configurations of atoms, screening effect and effective nuclear charge, extra stability of half-filled and completely filled orbitals.
- (b) *Nucleus and Radioactivity-I*: Nuclear particles; nuclear binding energy; mass defect and packing fraction; natural and artificial radioactivity; radioactive disintegration series; first order rate equation of radioactive disintegration; half life and average life period, group displacement law, unit of radioactivity; neutron-proton ratio and its implications, importance of radioactive isotopes, elementary concepts of fusion and fission.
- (c) *Chemical Periodicity*: Long form of periodic table, modern periodic law, types of elements on the basis of electronic configuration; periodic variation in properties atomic and ionic radii, ionization enthalpy, electro gain enthalpy, and electro negativity; diagonal relationship.

Unit ∏ 9½ marks

- (a) *Covalent Bonding*: Basic idea of valence bond theory and its limitations; Concept of hybridization of orbitals; valence shell electron pair repulsion (VSEPR) theory and shapes of molecules and ions: BeF₂, BF₃, H₃O⁺, NH₃, H₂O, H₂S, O₃, CO₂, BO₃³⁻, PCl₃, PCl₅, SF₄, SF₆; polarity of covalent bonds and dipole moment. LCAO-MO theory and its application to homonuclear diatomic molecules (H₂, N₂, O₂, O₂⁻², O₂⁻, O₂⁺, Ne).
- (b) *Ionic Bonding*: Ionic structures; radius ratio effect; limitation of radius ratio rule; concept of lattice energy and Born-Haber cycle; polarizing power; polarizability of ions and Fajan's rule.

(c) **Bonding in Metals, Semiconductors and Hydrogen Bond:** Qualitative idea of free electron theory and band theory in solids; elementary ideas on semiconductors (n and p types); hydrogen bonding – concept and types of H-bonding – application to inorganic molecules.

Section 2 (Organic) 19 Marks

Unit III 9½ marks

(a) *Structure, Bonding & Properties*: Hybridisation of orbitals, implications of hybridisation on the concept of bond length, bond energy, bond angles, shape of the molecules with following examples: (i) CH₄, H₃O⁺, ⁻CH₃, RNH₂; (ii) C₂H₄, ⁺CH₃, BF₃, AlCl₃, carbonyl compounds, and (iii) C₂H₂, R-CN, allene, ketene.

Nature of covalent bond and its orbital representation in molecules listed above.

Bronsted-Lowry and Lewis concepts of acids and bases, electronegativity, polarity of bonds and dipole moment, inductive effect and its role in substituted aliphatic carboxylic acids, effect of H-bonding on boiling point and solubility of organic compounds.

Conjugation, resonance, hyper-conjugation (propene and toluene), homolytic and heterolytic bond cleavage. Types of reagents – electrophiles and nucleophiles. Reactive intermediates: carbocatons, carbonions, free radicals, carbenes - stability and examples.

(b) *Organic Stereochemistry-I*: Concept of isomerism, types of isomerism - configurational and conformational isomerism. Fischer, Newman and sawhorse projections with suitable examples, geometrical isomerism, configuration of geometrical isomers, E and Z nomenclature, geometric isomers of oximes; optical isomerism – optical activity, chiral carbon atom, enantiomers, diastereomers, meso compounds, racemic mixture, resolution of racemic mixtures.

Unit IV 9½ marks

(a) Alkanes and Cycloalkanes: Nomenclature, methods of formation (with special reference to mechanism of Kolbe, Corey-House and Wurtz reactions), chemical reactivity (oxidation, cracking, aromatization). Reaction profile, activation energy, transition state and intermediate mechanism of chlorination, relative reactivity of halogens towards different types of alkanes, nitration, sulphonation.

General method of preparation of cycloalkanes (upto cyclohexane) and their rection with halogens and HX. Baeyer's strain theory- its limitations and modifications.

(b) *Alkenes and Alkynes*: Nomenclature of alkenes, methods of formation, chemical reactivity, mechanisms of hydrogenation, bromination, hydration, halohydration, hydroboration and Markownikoff's rule, mechanism of radical addition, peroxide effect, oxidation reactions, epoxidation, ozonolysis, hydroxylation. Polymerization.

Nomenclature, structure and bonding in alkynes, methods of formation, chemical reactivity, electrophilic addition reactions (halogenation, hydration, HX, HOX), ozonolysis, alkynides (Na, Cu and Ag) and polymerization; compare acidity of ethane, ethene and ethyne.

(c) Aromatic Hydrocarbons and Aromaticity: Structure of benzene, molecular orbital picture of benzene, stability of benzene ring, resonance energy, aromaticity, Huckel's (4n+2) rule and its application to simple molecules and ions, electrophilic, substitution reactions in aromatic hydrocarbons and general pattern of the mechanism, effect of substituent groups (activating and deactivating groups, directive influence) – mechanism of nitration, sulphonation, halogenation nuclear and side chain, formylation (Gattermann and Gattermann-Kotch), Friedel-Craft's alkylation and acylation.

Section 3 (*Physical*) 18 Marks

Unit V 9 Marks

- (a) Gaseous State-I: Kinetic theory of gases postulates of kinetic theory, collisions and gas pressure, average kinetic energy, root mean square speed and absolute temperature of gas, Boltzmann constant, gas laws and kinetic theory. Real gases-deviation from ideality, compressibility factor, van der Waals equation of state, virial equation of state.
- (b) **Liquid State-I:** Qualitative description of the structure of liquids, Physical properties of liquids vapour pressure, surface tension, viscosity, refractive index (definitions and descriptions), Liquid crystals- elementary discussion on structure and types of liquid crystals.

Unit VI 9 marks

- (a) *Crystalline State-I*: Law of constancy of interfacial angles, crystal planes, law of rational indices, Miller indices, space lattice and unit cell, packing in crystals, crystal defects.
- (b) *Colloids*: Classification of colloids, preparation of colloids peptisation, Bredig's method and condensation methods, purification of colloids, properties of colloids Tyndall effect, Brownian movement, electrophoresis and electro-osmosis, protective colloids and gold number.

Chem EH 101 Part B: Practical (Organic – Elective Only) 25 Marks (6:19)

Laboratory Course (Organic Chemistry)

Laboratory Course (Organic Chemistry)	
Total Time Practical Exams: 6 hours	
1. Qualitative Analysis	10 marks
Systematic qualitative analysis of organic compounds containing on	e functional group:
 (a) Detection of elements (N, Cl, Br, I) (b) Determination of one of the following functional groups (with sy -COOH, -NH₂, -NO₂, -OH (phenolic), -CHO and -CO- (c) Preparation of the derivative 	vstematic reporting)
2. Viva Voce	5 marks
3. Laboratory Record (Internal Assessment)	4 marks
Cham II 101, Duastical (Ougania Hanaus Oulu)	
Chem H 101: Practical (Organic – Honors Only) Laboratory Course (Organic Chemistry)	25 Marks (6:19)
Total Time Practical Exams: 6 hours	
1. Qualitative Analysis	10 marks
Systematic qualitative analysis of organic compounds containing tw	o functional groups:
(a) Detection of elements (N, Cl, Br, I and S)	
(b) Determination of any two of the following functional group single organic compound (with systematic reporting) -COOH, -OH (phenolic), -CHO, -CO-, -NH ₂ , -NO ₂ , -CONH ₂ , -S	•
(c) Determination of the melting point/boiling point of the compoun	
(d) Identification of the compound with help of a reference book	u.
(e) Preparation of the derivative and determination of its melting points	int
2. Viva Voce	5 marks
3. Laboratory Record (Internal Assessment)	4 marks

Note: Chem EH 101 Part B and Chem H 101 have different question papers.

Second Semester

Chem EH 201

PART A Inorganic, Organic & Physical Theory

75 marks (19:56)

Total: 100 Marks

Section 1 (*Inorganic*)

19 marks

Unit I 9 ½ marks

- (a) *Principles of Qualitative and Quantitative Analysis*: Solubility product and its applications in the Group separations of cations, Volumetric analysis standard solutions, primary standards, expressing concentrations of standard solutions, redox titrations (potassium permanganate, potassium dichromate, sodium thiosulphate and iodine), iodometric and iodimetric titrations, acid-base indicators and its theory.
- (b) *Acid-Base Concept*: Arrehenius and Bronsted-Lowry concept, the solvent-system (Franklin) concept and its limitations; Lewis concept; effect of solvent on relative strengths of acids and bases leveling effect; Relative strengths of acids and bases (pK_a and pH concept).

Unit II 9 ½ marks

- (a) **Redox Reactions**: Electronic concepts of oxidation and reduction, oxidation number, common oxidants and reductants, balancing of redox reactions by ion electron method, calculation of equivalent weights of oxidants and reductants, standard electrode potential, electrochemical series and its application.
- (b) **Some Concepts of Metallurgy**: Minerals and ores, principles and methods of extraction concentration, oxidation, reduction, electrolytic method and refining, occurrence and principles of extraction of aluminium, copper and iron.

(c) Industrial Chemistry

- (i) Fertilizers Nitrogen fertilizer, manufacture of ammonia, and urea. Phosphatic fertilizers
 calcium superphosphate, and NPK fertilizers.
- (ii) Cement constituents, manufacture and setting process, role of gypsum.
- (iii) Paints and Pigments: constituents of paints; classification of pigments on the basis of their color with examples.

Section 2 (Organic) 19 Marks

Unit III 9 ½ marks

(a) Nucleophilic Substitution Reactions: Nucleophile, ambident nucleophile, SN^{l} , SN^{2} , SN^{l} , factors affecting substitution reactions (structure of substrate, nature of nucleophile, solvent, role of leaving group), mechanism and stereochemistry of substitution reactions difference between nucleophile and bases.

- (b) *Elimination reactions*: E¹, E², E¹cB mechanisms, orientation in elimination reactions (Saytzeff's and Hoffmann's rules).
- (c) *Alkyl Halides*: Preparation and reactions (hydrogenolysis, aqueous and alcoholic KOH, NH₃, carbon nucleophiles, sulphur nucleophiles, KCN, AgCN, KNO₂, AgNO₂, RCOOAg, RONa, Mg, Li, Na).
- (d) *Aromatic Halogen Compounds*: Introduction, preparation and chemical reactivity, nuclear and side chain halogenation, electrophilic and nucleophilic substitution in aromatic halogen compounds. Role of ring substituents in nucleophilic substitutions.

Unit IV 9½ marks

- (a) *Alcohols*: Classification and nomenclature, method of preparation including hydration, hydroboration-oxidation and oxymercuration-reduction, industrial prepration of ethyl alcohol (from molasses and starch), reaction of alcohols, distinction between primary, secondary and tertiary alcohols (Victor Meyer's test, Lucas test), preparation and chemical reactions of glycol (HNO₃, HCl, PX₃, terephthalic acid, Oxidation) and glycerol. (HNO₃, HI, oxalic acid, KHSO₄)
- (b) *Phenols*: Nomenclature, structure and bonding. Preparation, industrial preparation from Cumene, physical properties and acidic character, chemical reactions, nitration, halogenation, sulphonation, Kolbe's reaction, Reimer-Tiemann reaction, phenol-formaldehyde resin.
- (c) Aldehydes and Ketones: Nomenclature and structure of the carbonyl group, method of preparation of aldehydes and ketones (both aliphatic and aromatic), chemical reactivity of carbonyl group, mechanism of nucleophilic additions and addition-elimination reactions with HCN, NaHSO₃, NH₂OH, NH₂-NH₂, C₆H₅NHNH₂, NH₂CONHNH₂) and Cannizzaro reaction; acidity of α-hydrogen in carbonyl compounds and formation of enolates, aldol condensation,

Perkin reaction and reactions with Grignard reagents, benzoin condensation, reduction and oxidation reactions (Clemmensen and Wolff-Kishner reductions).

Unit V 9 marks

(a) *Thermodynamics-I*: Definition of thermodynamic terms- system and surrounding, types of systems, intensive and extensive variables, types of processes- isothermal, adiabatic, isobaric, reversible, irreversible and cyclic processes; Thermodynamic functions- state variables and exact differentials, concept of heat and work, path functions and inexact differentials, zeroth law of thermodynamics, work done during reversible volume change of ideal gas.

First law of thermodynamics: Statement, internal energy, enthalpy, heat capacity at constant pressure (C_p) and volume (C_v) , relation between C_p and C_v . Limitations of first law, spontaneous processes, statements of second law. Joule-Thomson Coefficient and Inversion temperature.

(b) *Macromolecules:* Characteristics of macromolecules; degree of polymerization; concepts of number and weight average molecular mass; determination of molecular mass by osmometry and viscometry.

Unit VI 9 marks

- (a) Thermochemistry: Exothermic and endothermic reactions, Hess's law of constant heat summation, enthalpy of formation, standard state, enthalpy of combustion, enthalpy of neutralization, enthalpy of solution, enthalpy of dilution, Kirchoff's equations- influence of temperature on ΔH and ΔU of a reaction
- (b) Adsorption and Surface Phenomena: Physisorption and chemisorption, adsorption isotherms, derivation and application of Langmuir adsorption isotherm, Freundlich adsorption isotherm.

Chem EH 201

PART B *Practical* (Physical)

25 Marks (6:19)

Laboratory Course (Physical)

The following experiments are to be carried out in the class. In the examination, each student should be asked to do any **one** experiment from this list given below.

List of Experiments

- (1) Determination of the heat of neutralization of a strong acid by a strong base.
- (2) Determination of molecular weight by Rast's method
- (3) Study of the heat of dilution of H₂SO₄ and then to determine the strength of an unknown acid.
- (4) Determination of the velocity constant of the decomposition of hydrogen peroxide in presence of ferric chloride as catalyst by titrating against KMnO₄.
- (5) Determination of the solubility of BaCl₂/NaCl at two different temperatures and to determine the heat of solution.
- (6) Determination of the velocity constant of the hydrolysis of methyl acetate catalyzed by an acid.

Assignment of Marks

Experiment : 10 Marks

Viva Voce : 05 Marks

Laboratory Record : 04 Marks

Third Semester Total: 100 Marks

Chem EH 301

PART A Inorganic, Organic & Physical Theory

75 marks (19:56)

Section 1 (*Inorganic*)

18 marks

Unit I: s- and p-Block Elements and Their Compounds

6 marks

Group discussion of the elements with respect to position in the periodic table, electronic configuration, atomic and ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, oxidation states, variation of acidic and basic properties of their oxides and oxy-acids, inert pair effect and catenation.

Preparation, important reactions, structure and use of the following compounds: sodium thiosulphate. Potassium iodide, boric acid, aluminium chloride, lithium aluminium hydride, hydrazine, and lead tetraacetate.

Unit II: d- and f-Block Elements

6 marks

Electronic configuration of d-block elements, Transition metals-defination and characteristic features of transition metals, relative stability of oxidation states, variation of properties in first, second and third row transition metals.

Electronic configurations of lanthanides and actinides, comparison of their oxidations states, synthetic elements, variation in their atomic and ionic radii – lanthanide contraction, difficulty in the separation of lanthanides – and ion exchange method of separation.

Preparation, important reactions, structures and uses of nickel tetracarbonyl, potassium ferrocyanide, potassium ferricyanide, potassium dichromate, potassium permanganate, and uranium hexafluoride.

Unit III: Coordination Compounds

6 marks

Werner's Coordination theory, coordination number, ligands and their classification, chelation, applications of chelate formation; nomenclature of coordination compounds, effective atomic number rule, isomerism in coordination compounds, geometrical and optical isomerism in 4- and 6-coordinate complexes; Sidgwick's effective atomic number rule; stereochemistry of complexes

with coordination numbers 4 and 6, bonding in transition metal complexes: valence bond theory and elementary idea of crystal field theory for octahedral and tetrahedral complexes.

Section 2 (Organic) 19 marks

Unit IV 9½ marks

- (a) Carboxylic Acids and their Derivatives: Nomenclature, structure and bonding, effect of substituents on the acidity of carboxylic groups, methods of preparation, chemical reactivity, reactions of oxalic acid, succinic acid and citric acid. Preparation and properties of acid chlorides, amides, esters and anhydrides.
- (b) Organometallic Compounds-I: Grignard reagents: Synthesis of alkanes, alcohols, acids, aldehydes, ketones, amines with mechanism. Organolithium compounds: preparation and reactions with H_2O , CO_2 & epoxide.
- (c) Active Methylene Compounds: Active methylene group, examples of active methylene compounds, tautomerism, difference between tautomerism and resonance (keto-enol tautomerism). Synthetic use of ethyl acetoacetate and diethyl malonate.

Unit V 9½ marks

- (a) *Nitro Compounds (Aliphatic and Aromatic)*: Preparation, properties (aliphatic)—α—hydrogen acidity, halogenation, reaction with NaOH, HNO₂, hydrolysis, carbonyl compounds. Reduction of aromatic nitro compounds (aliphatic and aromatic)
- (b) Amines (Aliphatic and Aromatic): Nomenclature and structure of amines, preparation of amines, basicity and effect of substituents on basicity, chemical reactivity- acylation, action of nitrous acid, action of CS₂, carbyl amine reaction, condensation with carbonyl groups and ring substitution. Distinction between primary, secondary and tertiary amines and their separation.
- (c) *Diazo Compounds*: Preparation and stability of diazo compounds (aliphatic and aromatic). Reactions of benzene diazonium chloride. Preparation and reactions of diazomethane.

Section 3 (*Physical*)

19 marks

Unit VI 9½ marks

(a) Thermodynamics-II: Carnot cycle and its efficiency, Carnot's theorem, Entropy (S) as a state function, entropy changes of ideal gases in different processes. Gibbs function (G) and Helmholtz function (A), criteria for thermodynamic equilibrium and spontaneity, variation ΔG

and ΔA with pressure, volume and temperature, Gibbs-Helmholtz equation, Clausius-Clapeyron equation, Trouton's rule.

(b) *Chemical Equilibrium:* Law of mass action, equilibrium constant (K) from thermo-dynamic considerations, temperature and pressure dependence of equilibrium constants $(K_p \text{ and } K_c)$ – van't Hoff equation, relation of K_p and K_c , equilibria in homogeneous and heterogeneous systems, Le Chatelier's principle.

Unit VII 9½ marks

- (a) *Chemical Kinetics-I*: Rate of reaction and rate constant, molecularity and order of a reaction, zero order reaction, differential and integrated forms of rate equations of first and second order reactions, pseudo-unimolecular reactions, determination of order of reactions, effect of temperature on reaction rates and energy of activation, effect of catalyst.
- (b) **Dilute Solutions:** Colligative properties, Raoult's law and Henry's law, relative lowering of vapor pressure, elevation in boiling point, depression in freezing point, osmosis, osmotic pressure and its determination, relation between colligative properties and molecular mass, determination of molecular mass, van't Hoff factor, abnormal molar mass, Reverse osmosis and its applications.

Chem EH 301

PART B Practical (Inorganic-I)

25 marks (6:19)

Laboratory Course (Inorganic)

Total Practical Examination Time: 6 hours

Part I: Qualitative Analysis

10 marks

Inorganic Mixtures containing five radicals/ions to be analyzed – one of the radicals /ions must be interfering (borate, chromate or phosphate). Following ions/radicals to be included:

$$Ag^{+}, Pb^{2+}, Hg_{2}^{2+}, Hg^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, As^{3+}, Sb^{3+}, Sn^{2+}, Sn^{4+}, Fe^{2+}, Fe^{3+}, Al^{3+}, Ba^{2+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Mg^{2+}, K^{+}, NH_{4}^{+}.$$

Part II:

(a) Sessional Work : 4 marks

(b) Viva Voce : 5 marks

Fourth Semester

Chem EH 401

PART A Inorganic, Organic & Physical Theory

75 Marks (19:56)

Total: 100 Marks

Section 1 (*Inorganic*)

18 marks

Unit I 10 marks

- (a) *Organometallic Chemistry-I:* Definition and classification; synthesis, properties, nature of bonds, structure and application of one organometallic compound each of lithium, magnesium, and iron.
- (b) *Inorganic Polymers:* General properties of Inorganic polymers and distinction from the organic polymers; synthesis, structural aspects and uses of silicones, phosphonitrilic halides, phosphazenes, and tetrasulphurtetranitride.
- (c) *Interhalogens, Polyhalides and Pseudohalides* types of interhalogens and their reactivity, polyhalides of iodine, definition of pseudohalides study of CN⁻, SCN⁻, structure of ClF₃, BrF₃, BrF₅ and IF₇.

Unit II 8 marks

- (a) *Earth's Atmosphere*: Acid rain, smog, ozone layer (formation, decomposition, ozone hole).
- (b) *Waste-water treatment*: General criteria and guidelines; primary treatment, secondary treatment (activated sludge process and use of coagulants), and tertiary treatments processes (disinfection, sand bed filtration, electrodialysis, reverse osmosis).
- (c) *Solid waste disposal*: Composting; anaerobic digestion of biological wastes; incineration and landfills; e-pollution.
- (d) *Radioactive waste*: Types, sources and methods of disposal.

Section 2 (Organic)

19 marks

Unit III 9½ marks

(a) *Carbohydrates-I*: Classification and nomenclature, interrelationship among monosachharides. Reaction of glucose and fructose with Br₂, HCN, Tollen's reagent, Fehling's solution, hydroxylamine, phenylhydrazine, HNO₃ and osazone formation. Elucidation of pyranose and furanose structures. Determination of ring size. Haworth projection formula, configuration of

glucose and fructose. Epimerization, inter-conversion of aldoses and ketoses. Ascending and descending series.

- (b) Amino Acids: Classification, synthesis of α -haloacids and Gabriel syntheses of glycine, alanine, phenyl alanine; glutamic and aspartic acids. Physical properties, isoelectric points and zwitterionic structure. Elementary ideas of proteins and peptides.
- (c) *Urea*: Preparation of urea, reactions of urea with HNO₃, H₂O, HNO₂, NaOBr, CH₃COCl, C₂H₅OH, NH₂NH₂ and diethyl malonate, formation of biuret.
- (d) **Drugs:** Classification of drugs as antipyretic, analgesic, antibacterial, antiviral, antibiotic, sulpha drugs and tranquilizer with one example each. Synthesis and use of aspirin, paracetamol, sulphaguanidine, barbituric acid.

Unit IV 9½ marks

- (a) *Heterocyclic Compounds-I:* Introduction; molecular orbital picture, aromatic charact-eristics and resonance, preparation and electrophilic substitution reactions of pyrrole, furan and thiophene. Structure, synthesis and reactions of pyridine, comparative basicity of pyrrole/pyridine, pyrrole/pyrrolidine and pyridine/piperidine.
- (b) *Fats, Oils, Soaps and Detergents:* Animal and vegetable oils, drying and non-drying oils, hydrogenation, iodine value, RM value and saponification value, soaps and detergents, mechanism of cleansing action of soap and detergents.
- (c) *Dyes*: Relationship between colour and constitution, chromophore and auxochrome, classification of dyes (based on structure and application), syntheses of methyl orange, Bismarck brown, Malachite green and phenolphthalein.

Section 3 (Physical)

19 marks

Unit V 9½ marks

(a) *Ionic Equilibrium:* Ostwald's dilution law and its uses, dissociation equilibria of weak electrolytes, dissociation constant of weak acids (K_a) , ionic product of water (K_w) , hydrogen ion concentration and pH scale, buffer solutions and buffer activity, hydrolysis constant (K_b) , relation between K_a , K_w and K_b , derivation of hydrolysis constant for salts of (i) strong acid and weak base, (ii) weak acid and strong base and (iii) weak acid and weak base, solubility product, common ion effect.

(b) *Electrochemistry-I*: Electrical transport –conduction in metals and in electrolyte solutions, specific conductance, equivalent and molar conductances and their determination, variation of equivalent and specific conductance with concentration of strong and weak electrolytes. Migration of ions and Kohlrausch law, transport numbers and their determination using Hittorf's and moving boundary methods. Arrhenius theory of electrolyte dissociation.

Unit VI 9½ marks

- (a) *Electrochemistry-II:* Electrochemical cells. Half cells: types and examples; types of reversible electrodes; Electrode reactions; Nernst equation and standard electrode potentials; different types of electrodes, reference electrodes; sign conventions; electrochemical series.
- (b) *Phase Equilibria*: Phase rule and meaning of the terms phase, components and degrees of freedom, equilibrium between phases, phase diagram for one component systems (water and sulphur systems), Typical phase diagrams of two component systems involving eutectic (KI-H₂O), congruent (phenol-aniline) and incongruent (NaCl-H₂O) melting points.

Liquid-liquid mixtures, fractional distillation of binary miscible liquids, azeotropes (ethanol-water system), partial miscibility of liquids, lower and upper critical solution temperatures (triethylamine-water, phenol-water and nicotine-water systems), steam distillation, Nernst distribution law – derivation and its application.

Chem EH 401

PART B Practical (Inorganic-II)

25 Marks (6:19)

Laboratory Course (Inorganic)

Total Practical Examination Time: 6 hours

Section 1: Quantitative Analysis

10 marks

Volumetric Estimation: Redox titration involving potassium permanganate, and potassium dichromate for the estimation of Fe²⁺, Fe³⁺ and Ca²⁺ and iodometric estimation of Cu²⁺.

Section 2: 9 marks

(a) Sessional Work: 4 marks

(b) Viva Voce: 5 marks

Fifth Semester

Chem H 501 100 Marks (25:75)

PART A Inorganic Theory

38 marks

Total: 200 Marks

Unit I 7 marks

- (a) *Molecular Symmetry*: Symmetry elements and symmetry operations: symmetry planes and reflections, inversion center, proper axis and proper rotations, improper axis and improper rotations; molecular point groups; systematic classification of molecules into point groups with examples $\{(i) \text{ linear molecules}, (C_{\infty v}, D_{\infty}h), (ii) \text{ molecules with no } C_n \text{ or } S_n$, $(C_s \text{ and } C_1 \text{ only})$,
- (iii) molecules with cubic point group, $(T_d \text{ and } O_h)$, (iv) H_2O , NH_3 , $XeOF_4$, XeF_4 , PF_5 , B_2H_6 , Cyclohexane (chair and boat forms)}.
- (b) *Error Analysis*: Significant figures; errors, types of error; accuracy and precision; normal distribution of indeterminate errors; propagation of errors mean and standard deviations; rejection of data the F-test, t-test and Q-test.

Unit II 8 marks

- (a) Complexometric titration (using EDTA), metal ion indicators, masking and demasking reagents; principles of argentometric titrations, estimation of chloride using adsorption indicators; principles of gravimetric estimation of chloride, theory of precipitation, coprecipitation, post-precipitation and digestion of the precipitate.
- (b) Organic Reagents in Inorganic Analysis: Basic qualities of the reagents and conditions; advantages of organic precipitants and their limitations; study of Oxine, α -nitroso β -naphthol, cupferron, cupron, and dimethylglyoxime.

Unit III 8 marks

Nucleus and Radioactivity-II: Types of radioactive decay; radioactive equilibrium; spontaneous fission, nuclear reactions, Q value, principles of separation of isotopes – gaseous diffusion, electrolysis and electromagnetic separation methods; application of radioisotopes as tracers; detection and measurement of radioactivity.

Stability of nucleus and nuclear forces, magic number concept, nuclear binding energy; Basic principles and types of nuclear reactors; India's Nuclear Energy Program.

Unit IV 7 marks

Crystal Field Theory (CFT): (i) d-orbital splitting by electrostatic field (octahedral, tetrahedral and square planar geometry), and (ii) magnetic properties (high spin and low spin complexes); factors affecting crystal field splitting energy (10Dq value) and spectrochemical series; Structural and thermodynamic effects of d-orbital splitting, variation of ionic radii, Jahn-Teller effect, hydration and lattice energies of first row transition metal ions; octahedral vs. tetrahedral coordination; adjusted CFT and molecular orbital theory for octahedral complexes.

Unit V 8 marks

Magnetochemistry: Explanations of diamagnetism, paramagnetism, ferromagnetism and antiferromagnetism, origin of paramagnetic moment: electron spin moment and orbital angular moment, magnetic susceptibility, Curie law, Curie-Weiss law, Bohr magneton, magnetic susceptibility measurement by Gouy and Faraday methods; explanation of magnetic behaviour of $K_4[Fe(CN)_6]$, $K_3[Fe(CN)_6]$, $[Co(NH_3)_6]Cl_6$, $K_2[Ni(CN)_4]$, $K_3[CoF_6]$, $K_3[MnF_6]$, $Ni(CO)_4$.

PART B Organic Theory

37 Marks

Unit I 9 marks

- (a) Organic Acids and Bases: Bronsted-Lowry and Lewis concepts of acids and bases, electro- negativity, polarity of bonds and dipole moment, inductive effect and its role in substituted aliphatic carboxylic acids. Relative strengths of acids and bases [alcohols, phenols, carboxylic acid, dicarboxylic acids, amines, heterocyclic compounds, carbon acids and bases]; pKa concept; effect of resonance, induction, hybridisation, H-bonding and steric effect on acidity and basicity of molecules.
- (b) **Polynuclear Aromatic Hydrocarbons:** Introduction; molecular orbital structure of naphthalene; resonance; Preparations, reactions, mechanism and orientation of electrophilic substitution. Preparations and reactions of α and β -naphthols (azo-coupling, reactions with HNO₂ and FeCl₃. Preparation and reactions of Anthracene.

Unit II 9 marks

(a) Organic Stereochemistry-II: Nomenclature of enantiomers (R and S); relative and absolute configuration; inversion, retention, conformation and conformational isomerism in ethane and n- butane; conformation of cyclic compounds – cyclohexane, mono-substituted and

disubstituted

cyclohexanes with reference to their relative stability; stereochemical aspects of addition of bromine to alkenes.

- (b) *Introduction to Dienes*: Conjugated, isolated and cumulated dienes (allenes); preparations and reactions of conjugated dienes (1,3-butadiene and isoprene). Addition reaction of 1,3-dienes (1,2 and 1,4).
- (c) *Polymers*: Types of polymers and polymerization processes. Addition (chain-growth) polymerization; free radical vinyl polymerization; ionic vinyl polymerization [Ziegler–Natta polymerisation]. Condensation (step-growth) polymerization, polyesters, polyamides, ureaformaldehyde resins, polyurethanes. Natural and synthetic rubbers.

Unit III 9 marks

(a) *Introduction to Organic Synthesis*: Formation of carbon-carbon bond, electrophilic and nucleophilic carbon species, acid-assisted reaction (Friedel Crafts alkylation and acylation, Gatterman-Koch formylation), base assisted condensations (Knoevenagel, Michael, Wittig reaction, Claisen reaction, Claisen-Schmidt reaction, Mannich reaction).

Formation and acid-assisted cleavage of acetals and ketals, mechanism of formation and hydrolysis of esters and amides (acyclic and cyclic).

- (b) *Rearrangements*: Carbocation rearrangements pinacole-pinacolone, Wagner-Meerwein, dienone-phenol. Beckmann, Wolff, Hofmann, Curtius, Lossen, Schmidt, benzil-benzilic acid, benzidine-semidene, Favorskii, Fries and Claisen rearrangements.
- (c) *Inorganic Reagents in Organic Synthesis*: NaBH₄, LiAlH₄, B₂H₆, Na/liq.NH₃, aluminium isopropoxide, KMnO₄, K₂Cr₂O₇, HIO₄, Lead tetraacetate, peracids.

Unit IV 10 marks

- (a) *Heterocyclic Compounds-II*: Introduction to condensed five- and six-membered heterocycles, preparation and reactions of indole, quinoline and isoquinoline with special reference to Fischer-Indole synthesis, Skraup and Bischler-Napieralski syntheses.
- (b) *Green Chemistry*: Definition, goals, principles and techniques (brief discussions); Applications to common reactions. Solvent free reactions, Ultrasound reactions, Microwave assisted reactions, Reactions in aqueous and ionic media.

(c) *Interconversions*: Interconversion involving following functional groups (mechanism not required): -OH. -CHO, -CO, -COOH, -COOR, -CONH₂, -NH₂, NHR, -NO₂, -CN, SO₃H, X (Cl, Br, I). (Aliphatic to aliphatic and aromatic to aromatic)

Chem H 502 100 Marks

PART A Physical Theory

50 Marks (13:37)

Unit I: Gaseous State-II 9 marks

Maxwell's distribution law of molecular speeds, molecular speeds and energy distribution as a function of temperature, calculation of the most probable, average and root mean square speeds of molecules, Maxwell-Boltzmann distribution, degrees of freedom of motion, principle of equipartition of energy, collision diameter, collision cross-section, collision frequency and mean free path, viscosity of gases, Boyle temperature, critical phenomena-critical constants, p-v isotherm of carbon dioxide, continuity of state, law of corresponding states and reduced equation of state, vapour density and limiting density.

Unit II: Liquid State-II

6 marks

Determination of surface tension, viscosity and refractive index of liquids. Physical properties and chemical constitution- additive and constitutive properties, molar volume, parachor, specific and molar refraction. Polar and non-polar liquids, dielectric constant, dipole moment, structure of molecules, polarization, Clausius-Mossotti equation. Dipole induced dipole and vander Waals interactions in molecules.

Unit III: Crystalline State-II

6 marks

Symmetry elements in crystals-plane of symmetry, axis of symmetry, centre of symmetry, seven crystal systems, Law of symmetry, Bravais lattices, X-ray diffraction of crystals, Bragg's law, crystal structure determination-Laue's method and powder method, Frenkel and Schottky defects.

Unit IV: Thermodynamics-III

7 marks

Thermodynamic scale of temperature, Maxwell's relations, definition of chemical potential, concept of chemical potential, equilibrium between different phases, derivation of phase rule from the concept of chemical potential, partial molal quantities, variation of chemical potential with temperature and pressure, chemical potential of a component in an ideal mixture, Gibbs-Duhem equation.

Nernst heat theorem, third law of thermodynamics and its application to the determination of entropy, concept of residual entropy.

Unit V: Chemical Kinetics-II

9 marks

Catalyzed reactions – homogeneous catalysis, acid-base catalysis, enzyme catalysis - Michaelis-Menten equation; Theory of Reaction rates – collision theory, transition state theory of unimolecular and bimolecular reactions.

Complex reactions – opposite, parallel, consecutive and chain reactions, rate determining step, steady state approximation and derivation of rate laws of complex reactions.

Chem H 502 PART B (Practical – Organic)

25 Marks (6:19)

Laboratory Course (Organic)

Total Time for Practical Exams: 6 hours

1. Separation of Mixtures

4 marks

- (a) Separation of binary organic mixtures based on acid-base concept
- (b) Determination of melting points
- 2. Organic Preparation

6 marks

- (a) Preparation of the following compounds
 - (i) Phthalimide (from phthalic anhydride)
 - (ii) m-Dinitrobenzene (from benzene)
 - (iii) Picric acid (from phenol)
 - (iv) p-Bromoacetanilide (from acetanilide)
 - (v) Benzilic acid (from benzil)
 - (vi) Methyl Orange (from sulphanilic acid)

3. Viva Voce 5 marks

4. Laboratory Record (Internal Assessment)

4 marks

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Chem H 502 PART C (Practical – Physical)

25 Marks (6:19)

Laboratory Course (Physical)

Total Practical Examination Time: 6 hours

The following experiments are to be carried out in the class. In the examination, each student should be asked to do any **one** experiment

List of Experiments

- 1. Conductometric titrations of an acid by a base.
- 2. Acid-base titration using potentiometer.
- 3. Verification of Beer-Lambert's law using copper sulfate or K₂Cr₂O₇ solution colorimetrically and determination of the concentration of the supplied solution
- 4. Determination of velocity constant for the decomposition of hydrogen peroxide using ferric chloride as catalyst; and to determine the activation energy.
- 5. Determination of the heat of solution of solid calcium chloride and to determine lattice with the help of Born-Haber cycle.
- 6. Determination of the critical solution temperature of the phenol-water system.
- 7. Study on the kinetics of the reaction between potassium persulfate and potassium iodide at two temperatures with determination of activation energy
- 8. Study of the adsorption of oxalic acid on charcoal and verification of Freundlich's adsorption isotherm.
- 9. Determination of surface tension of a liquid/solution by drop-weight method.
- 10. To obtain the viscosity–composition (v/v) curve of ethanol-water/ glycerol-water/ methanol-water system and to determine the composition (v/v) of a given unknown mixture.
- 11. Determination of partition coefficient of a solute between two immiscible solvents (e.g. iodine in water/organic solvent; benzoic acid in water/benzene).
- 12. Determination of pKa value of different sets of buffer by pH-metric titration using glass electrode

(cont'd

Distribution of marks:

Viva Voce : 05 Marks

Laboratory Record : 04 Marks

Experiment : 10 Marks

Sixth Semester Total: 200 Marks

Chem H 601 100 Marks (25:75)

PART A Inorganic Theory

50 Marks

Unit I: Organometallic Chemistry-II

10 marks

Synthesis, properties, nature of bonds, structure and application of organometallic compounds of lithium (alkyl and aryl), magnesium (RMgX and MgR₂), iron (ferrocene) and tin (R₃SnX, R₂SnX₂ types); metal-ethylenic complexes and homogeneous hydrogenation;

Π-acid ligands, mononuclear and dinuclear carbonyls and nitrosyls and the nature of bonding in them – their uses in metallurgy; Important applications of organometallic compounds in heterogeneous catalysis – hydrogenation of alkenes using Wilkinson's catalyst and synthesis of acetic acid using rhodium carbonyl iodide catalyst.

Unit II: Bioinorganic Chemistry

10 marks

Essential and trace elements in biological processes, criteria of essential elements, pH of biological fluid, metalloporphyrins, structure, and functions of haemoglobin, myoglobin and chlorophyll; role of Fe and Mg in haemoglobin and chlorophyll, role of Co in vitamin B₁₂, Carbonic anhydrase, its characteristics and functions,. Non-complexing cations in biochemical processes, Na⁺-K⁺ pump; Toxic effects of metal ions with reference to mercury, lead, beryllium and aluminum; deficiency of Fe, Ca, Mg and iodine; Platinum complexes as anti-cancer drugs.

Unit III: Spectroscopic Methods in Inorganic Chemistry

6 marks

Application of the following techniques for Inorganic and Coordination compounds:

- (a) *UV-Visible Spectroscopy:* Free ion terms and their splitting in octahedral symmetry, Selection rules, Orgel diagrams for octahedral/tetrahedral complexes (d¹, d², d8, and d9 systems).
- (b) *IR Spectroscopy:* Basic principles, spectral studies of coordination compounds containing following molecules or ions as ligands: H₂O, CN, CO, SO₄²⁻, and halides (F, Cl, Br, I)

Unit IV 6 marks

Reactivity of Coordination Compounds: Thermodynamic stability; Stepwise formation constant, Kinetic lability and inertness, Mechanisms of Ligand displacement reactions in octahedral and square planar complexes, the *trans* effect, Determination of composition of complexes by spectrophotometric method.

Unit V 6 marks

Nanomaterials: General introduction to nanomaterials and emergence of nanotechnology, Types of nano materials, Synthesis of nanoparticles of gold, platinum and silver; properties of nanoparticles; important applications of nanoparticles.

PART B Organic Theory

50 Marks

Unit I 10 marks

- (a) *Carbohydrates-II*: Disaccharides: Maltose and sucrose their reactions and structure, structure of cellulose and starch (detailed study not required), preparation of cellulose nitrate, cellulose acetate and cellophane.
- (b) *Natural Products*: (i) Terpenoids: Introduction, isoprene rule, classification, isolation, structural elucidation and syntheses of citral and geraniol. (ii) Alkaloids: Introduction, classification, physiological action, extraction and syntheses of nicotine and cocaine.

Unit II 9 marks

- (a) **Peptides, Proteins and Vitamins:** (i) Peptides definition and preparation of di- and tripeptides from α -amino acids. (ii) Proteins introduction, classification, primary, secondary, tertiary and quart-ernary structures of proteins, α and β -proteins, helical and sheet structures.
- (iii) Vitamins definition, classification and biological importance of vitamins. Carotenoids occurrence, isolation and synthesis, β -carotene as a source of vitamin A_1 , synthesis of vitamin A_1 and ascorbic acid.
- (b) *Topics in Biological Chemistry:* (i) Enzymes Introduction, nomenclature and characteri- stics. Mechanism of enzyme action (a general picture); mechanism of action of the enzyme chymotripsin 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. (ii) 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.

Unit III 9 marks

(a) Organic Photochemistry: Molecular energy and photochemical energy, excitation of

molecules, Franck-Condon principle, dissipation of energy, Jablonski diagram, singlet-triplet

states, fluorescence and phosphorescence, photosensitization and quenching, quantum yield. Introduction to photochemical reactions of carbonyl compounds, photoreduction. Norrish Type I and Type II cleavages. Paterno-Buchi reaction.

(b) **Pericyclic Reactions:** Definition and scope of pericyclic reactions. (i) Electrocyclic reactions – stereochemistry, conrotatory and disrotatory ring closures and ring opening (simple examples like 1,4-disubstituted 1,3-buta-diene, 1,6-disubstituted-1,3.5-hexatriene, 1,8-disubstituted-1,3,5,7-octatetraene). Woodward-Hoffmann rules for electrocyclic reactions, frontier molecular orbital theory (correlation diagram not required). (ii) Cycloaddition reactions – Definition of dienes and dienophiles, supra-supra and antara-antara modes of cycloadditions $(\pi^4 + \pi^2, \pi^4 + \pi^2, \pi^2 + \pi^2, \pi^2 + \pi^2)$ by taking examples of simple dienes and dienophiles.

Unit IV Spectroscopy for Structural Analysis

9 marks

- (a) *Mass Spectrometry* Basic principles, types of ions produced in mass spectrometer, molecular ion peak, base peak and metastable ion, determination of molecular mass of organic compounds.
- (b) *Ultraviolet and Visible Spectroscopy* Basic principles of UV and visible spectroscopy, application to conjugated polyenes, carbonyl compounds and α,β -unsaturated carbonyl compounds, Woodward rules.
- (c) *Infrared Spectroscopy* Basic principles, characteristic vibrational frequencies of carbonyl compounds, hydroxyl and amino compounds.
- (d) *Nuclear Magnetic Resonance Spectroscopy* Basic principles, chemical shifts, shielding and deshielding of protons, chemically equivalent protons, PMR- peak area and proton counting. Characteristics protons chemical shifts and coupling constants for ethyl bromide, toluene, p-xylene, o-and p-nitrotoluene, anisole, ethyl alcohol, ethyl acetate, acetaldehyde and acetic acid.

Chem H 602 100 Marks

PART A Physical Theory

50 Marks (12:38)

Unit I: Boltzmann Distribution

5 marks

Idea of mathematical and thermodynamic probability; entropy and probability; Boltzmann distribution (without derivation) for non-degenerate and degenerate cases; application to barometric distribution formula. Idea of partition functions.

Unit II: Elementary Quantum Mechanics

10 marks

Failure of classical mechanics: Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect, heat capacity of solids; Postulates of quantum mechanis; Model systems (with complete derivation of wavefunction & energy expression): Particle-in-a-box, rigid rotor, harmonic oscillator; quantum numbers and their importance.

Unit III: Molecular Spectroscopy

10 marks

Introduction: electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

Rotational and Vibrational spectra of diatomic molecules: frequency expressions, selection rules and applications to estimate molecular parameters; isotope effect in vibrational spectrum.

Unit IV: Photochemistry

5 marks

Beer-Lambert's law, Einstein's law; Concept of potential energy curves; Frank-Condon principle; primary photophysical processes; Jablonski diagram; Fluorescence and phosphor- escence; photochemical reactions and quantum yield, photosensitized reactions.

Unit V: Electrochemistry-III

8 marks

Activity and ionic activity coefficient; mean ionic activity. Ion atmosphere; electrophoretic and relaxation effects; Onsager equation (qualitative); Wien and Debye-Falkenhagen effects; Debye-Huckel theory (qualitative) and the limiting law. Solubility of sparingly soluble salts and ionic strength of medium. Standard cells, concentration cells (with and without transport), liquid junction potentials.EMF of a cell and its measurements. Calculation of thermodynamic parameters (Δ H, Δ G, Δ S and K) from cell EMF, polarization and over potential. Applications of Ag/AgCl, quinhydrone and glass electrodes. potentiometric titrations with examples.

E ...

Chem H 602 PART B: Practical (Inorganic)

35 Marks (8:27)

Laboratory Course (Inorganic Quantitative Analysis)

20

marks Total Practical Examination Time: 12 hours

Estimation (volumetric or gravimetric) of metal constituents from mixtures of Iron-Calcium, Iron-Copper, Copper-Zinc, Calcium-Barium, Copper-Nickel (separation of one metal constituent must be carried out).

Sessional Work and Viva Voce

7 marks

(a) Sessional Work:

3 marks

(b) Viva Voce:

4 marks

Chem H 602 PART C: Seminar

15 Marks

The Seminar shall be conducted internally by the Department of Chemistry of the respective colleges. There shall be no external examiner, but the Seminar shall be conducted formally latest by the end of October each year. A Report of the same along with the marks awarded shall be sent to the Examinations Department on or before 30th November each year.

The Topic of the Seminar shall be decided by the Department and informed to the student at least 30 (thirty) days ahead of the exact date of the Seminar. Each student shall choose a topic in consultation with the Department. The topics must be from any of the subjects of contemporary interest in Chemistry. Students must submit a Write-up of the Seminar.

Marks distribution shall be as follows:

1. Write-up and content : 4 marks

2. Presentation : 7 marks

3. Questions/Answers : 4 marks

Department of Chemistry

Course distribution: Syllabus 2015 (Year 2017 - Year 2018)

Outcome of the Under Graduate Course in B. Sc in Chemistry.

A student after graduation and obtaining a degree in Chemistry gains knowledge and understanding of the subject matter both theoretically and also practically and how one can handle chemicals safely. It also help in expanding their knowledge base on the subject which makes available opportunities for them to get placement in different department related to chemistry in both Government Services through Public Services Commission as well in non government organization and private sector.

After graduating from B.Sc. Course in Chemistry, this helps them get job opportunities in different related field such as food safety, health inspector, pharmaceutical industries, pharmacist, water industries, beverages industries, steel & alloys industries etc. It helps in gaining broad perspectives foundation in chemistry that stresses scientific reasoning and analytical problem solving. It helps to achieve the skills required in getting job opportunities in teaching professions such as graduation school, professional school, in chemical industries, cement factories, paint industries, agro products industries, food processing industries, petro chemical industries, fertilizer industries, pollution control board etc.

A graduate gets exposure in how to handle different experimental technique and instruments. It helps to gain knowledge and deep insight of the nature and valuable role played by metals and non metals in daily life. Knowing and understanding the basic concept of chemistry also helps in better understanding of the subjects as well namely mathematics, physics, biological sciences, agricultural sciences, medicines, environmental sciences etc. as chemistry is a subject that is inter-related to these subject. Chemistry is a subject that helps one's to gain knowledge, learn and gets exposure in laboratory skills and safety measure which can be applied while working in different fields and environment.

A students after graduating in Chemistry, he or she can opt for postgraduate in M.Sc in Chemistry, M.Sc in Pharmaceutical Chemistry, Postgraduate Diploma in Analytical Chemistry, Postgraduate diploma in Biotechnology, M.Sc in Biochemistry, M.Sc in Computational Chemistry.

Dr. Wancydore Kharmawphiang

Department of Chemistry Seried College, Shilloop FirstSemester |

Total:100Marks

ChemEH 101:Part Alnorganic,Organic&PhysicalTheory-75 marks

Total:100marks

PartBPractical(Organic - Elective) -25marks

ChemH101:Practical(Organic-Honors)

-25marks

(ChemEH101 isbothHonorsand Elective; ChemH 101 ispurelyHonors)

SecondSemester

Total: 100Marks

ChemEH 201:Part Alnorganic, Organic&PhysicalTheory-75 marks Total:100marks

PartBPractical(Physical)

-25marks

ThirdSemester Total:100Marks

ChemEH 301:PartAlnorganic,Organic&PhysicalTheory-75 marks

Total:100marks

PartBPractical(Inorganic-I)

-25marks

FourthSemester

Total:100Marks

ChemEH 401:PartAlnorganic,Organic&PhysicalTheory-75 marks Total:100marks

PartBPractical(Inorganic-II)

-25marks

FifthSemester

Total:200Marks

ChemH501:Part AlnorganicTheory

-50marks Total:100marks

PartBOrganicTheory

-50marks

ChemH502:PartAPhysicalTheory

-50 marks Total:100marks

PartBPractical(Organic)

-25marks

PartCPractical(Physical)

-25marks

SixthSemester

Total:200Marks

ChemH601:PartAlnorganic Theory

-50 marks Total:100marks

PartBOrganic Theory

-50marks

ChemH602: PartA Physical Theory

-50marks

Total:100marks

PartB Practical (Inorganic) PartC Seminar

-35marks -15marks

Note: H stands for Honors alone; E stands for Elective alone; EH stands for both Elective and Honors.

FirstSemester

Total:100Marks

Chem-EH101

1:3ratio

PARTA Inorganic, Organic&PhysicalTheory

75marks(19:56)

Section1

Inorganic

19Marks

UnitI

- (a) Mrs L. Massar
- (b) Shri D. Kharbani
- (c) Dr. W. Kharmawphlang

Unit II

- (a) Dr. W. Kharmawphlang
- (b) Dr. W. Kharmawphlang
- (c) Dr. W. Kharmawphlang

Section 2

Organic

19 Marks

Unit III

- (a) Shri S. Marsharing
- (b) Shri S. Marsharing

Unit IV

- (a) Smt. L. Massar
- (b) Shri S. Marsharing
- (c) Mrs. L. Massar

Dr. Wencydora Knamewsmang
H.O.D
Department of Chamistry
and Codoga, Shalony

Physical

19 Marks

Unit V

- (a) Shri N. Kharbani
- (b) Dr. S. S. Islam

Unit VI

- (a) Dr. S. S. Islam
- (b) Shri N. Kharbani

LabCourse Organic General Paper

25 Marks (6:19)

Practical: Shri S. Marsharing

Organic Practical Honours Paper : Shri S. Marsharing

Second Semester

Total Marks: 100

Part A Inorganic, Organic & Physical

75 Marks(19:56)

Section I Inorganic 19Marks

Unit I

- (a) Dr. W. Kharmawphlang
- (b) Dr. W. Kharmawphlang

Unit II

- (a) Mrs L. Massar
- (b) Shri D. Kharbani
- (c) (i0 Shri D. Kharbani
 - (ii) &(iii) Dr. W. Kharmawphlang

Section 2 Organic

19 Marks

Unit III

(a), (b) & (c); Shri S. Marsharing

Unit Iv

(a) Mrs L. Massar

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Smod College, Shillows

- (b) Shri S. Marsharing
 - (c) Mrs L Massar

Section 3

Physical

19 Marks

Unit V

- (a) Shri N. Kharbani & Dr. S. S. Islam
- (b) Shri N. Kharbani

Unit VI

- (a) Dr. S.S. Islam
- (b) Shri N. Kharbani

Part B

Practical: Physical

25 Marks (6:19)

Lab Course: Shri N. Kharbani

Third Semester

Total Marks: 100

Part A

Inorganic, Organic & Physical

75 Marks(19:56)

Section I

Inorganic

19Marks

Unit I

(a) S-block elements: Mrs. L. Massar

p-blocks elements : Dr. W. Kharmawphlang

Unit II

(a) Shri D. Kharbani

Unit III

Dr. W. Kharmawphlang

Section 2 Organic

19Marks

Unit Iv

(a) Mrs L. Massar

(b) Shri N. Kharbani

Dr. Wancydoru resemble Assemblig H.O.D.

Wharmanghlang

Department of Charastry Synod Callege, Shilling

Unit V

- (a) Shri S Marsharing
- (b) Shri s. Marsharing
- (c) Mrs L. Massar

Section 3

Physical

19 Marks

Unit V : Dr. S.S. Islam

Unit VI : Shri N. Kharbani

Part B

Practical: Inorganic I

25Marks (6:19)

Lab Course: Shri N. Kharbani & Mrs L. Massar

Fourth Semester

Total Marks: 100

Part A

Inorganic, Organic & Physical

75 Marks(19:56)

Section I Inorganic

19Marks

Unit I

- (a) &
- (b) Shri D. Kharbani
- (c) Dr. W. Kharmawphlang

Unit II: Dr. W. Kharmawphlang

Section 2

Organic

19Marks

Unit III

(a), (b) & (c) ; Shri S. Marsharing

(d) Mrs. L. Massar

Unit IV

- (a) Shri S. Marsharing
 - (b) Mrs L. Massar
 - (c) Shri 5. Marsharing

Section 3

Physical

19 Marks

Unit V

- (a) Shri N. Kharbani
- (b) Dr. S. S. Islam
- (a) Shri N. Kharbani
- (b) Dr. S.S. Islam & Shri N. Kharbani

Part B Practical (Inorganic II)

25Marks (6:19)

Lab Course : Dr. W. Kharmawphlang

Fifth Semester Total Marks: 200

ChemH 501 100 Marks (25:75)

Part A Inorganic Chemistry 38 Marks

Unit I

(a) Dr. W. Kharmawphlang

(b) Mrs L. Massar

Unit II

(a) Shri D. Kharbani

(b) Dr. W. Kharmawphlang

Unit III: Shri D. Kharbani

Unit IV: Dr. W. Kharmawphlang

Uint V: Dr. W. Kharmawphlang

Part B Organic Chemistry 37 Marks

UNIT 1 : Mrs L. Massar

Unit II: Shri S. Marsharing

Unit III

(a) &

(b) Mrs L. Massar

(c) Shri S. Marsharing

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Unit IV: Shri S. Marsharing

Chem502 100 Marks

Part A Physical Theory 50 Marks(13:37)

Unit I: Shri. N. Kharbani

Unit II: Shri N. Kharbani

Unit III: Dr. S. S. Islam

Unit IV: Dr. S. S. Islam

Unit V: Shri N. Kharbani

Part B Practical - Organic 25 Marks (6:19)

Lab Course: Shri S. Marsharing

Part C Practical Physical 25 Marks (6:19)

Lab Course : Dr. S. S. Islam

Sixth Semester Total Marks : 200 Marks

ChemH 601 100 Marks (25:75)

Part A Inorganic Chemistry 50 Marks

Unit 1 : Shri D. Kharbani

Unit II: Dr. W. Kharmawphlang

Unit III: Mrs L Massar

Unit IV: Dr. W. Kharmawphlang

Unit V: Dr. W. Kharmawphlang

Part B Organic Chemistry 50 Marks

Unit I

(a) Shri S. Marsharing

(b) Mrs. L. Massar

Unit II: Mrs L. Massar

Dr. Wurkydora Kharmawphiang
H.O.D
Department of Chemistry

Synod College, Shillong

Unit III: Shri S. Marsharing

Unit IV: Shri S. Marsharing

Chem H 602 100 Marks

Part A Physical Chemistry 50 Marks (12:38)

Unit I: Dr S. S. Islam

Unit II: Dr. S. S. Islam

Unit III: Shri N. Kharbani

Unit IV: Shri N. Kharbani

Unit V: Dr. S. S. Islam & Shri N. Kharbani

Chem H 602 Part B Practical - Inorganic 35 Marks (9:26)

Lab Course Inorganic Quantitative Analysis

Dr. W. Kharmawphlang

ChemH 602 Part C Seminar 15 Marks

All Faculty Members

Dr. Wrancyelora Kharmawprisans
H.O.D

Department of Chamistry
Synod College, Shallong

PROPOSED STRUCTURE & MARKS DISTRIBUTION FOR THE NEW B.Sc. PROGRAMME IN CHEMISTRY (NEHU) (ONLY CHEMISTRY PAPERS MENTIONED)

First Semester Total: 100 Marks

Chem EH 101: Part A Theory (Inorganic-I, Organic-I & Physical-I) – 75 marks

Part B Practical (Organic LC-I) – 25 marks

Chem H 101: Practical (Organic LC- I - Honors) – 25 marks

(Chem EH 101 is both *Honors* and *Elective*; Chem H 101 is purely *Honors*)

Second Semester Total: 100 Marks

Chem EH 201: Part A Theory (Inorganic-II, Organic-II & Physical-II) – 75 marks

Part B Practical (Physical LC-I) – 25 marks

Third Semester Total: 100 Marks

Chem EH 301: Part A Theory (Inorganic-III, Organic-III & Physical-III) – 75 marks

Part B Practical (Inorganic LC-I) – 25 marks

Fourth Semester Total: 100 Marks

Chem EH 401: Part A Theory (Inorganic-IV, Organic-IV & Physical-IV) – 75 marks

Part B Practical (Inorganic LC-II) – 25 marks

Fifth Semester Total: 200 Marks

Chem H 501: Inorganic Chemistry-V- 50 marksChem H 502: Organic Chemistry-V- 50 marksChem H 503: Physical Chemistry-V- 50 marksChem H 504: Part A Practical (Organic LC-II)- 25 marksPart B Practical (Physical LC-II)- 25 marks

Sixth Semester Total: 200 Marks

Chem H 601: Inorganic Chemistry-VI− 50 marksChem H 602: Organic Chemistry-VI− 50 marksChem H 603: Physical Chemistry-VI− 50 marksChem H 604: Part A Practical (Inorganic LC-III)− 25 marksPart B Dissertation− 25 marks

Note: H stands for Honors alone; **E** stands for Elective alone; **EH** stands for both Elective and Honors. The above assignments of Course Numbers (e.g. **Chem E 201**) is only tentative

First Semester Total: 100 Marks

Chem EH 101 1:3 ratio

PART A Inorganic, Organic & Physical Theory 75 marks (19:56)

Section 1 (Inorganic) 19 Marks

Unit I 9½ marks

(a) Structure of Atom: Limitations of Bohr's atomic model; idea of the de Broglie matter waves, Heisenberg's uncertainty principle; Schrodinger's wave equation and its importance; quantum numbers; concept of wave function; physical concepts of Ψ and Ψ 2; radial and angular wave functions; shapes of s, p and d-orbitals, Aufbau principle, Pauli's Exclusion Principle, Hund's rule, electronic configurations of atoms, screening effect and effective nuclear charge, Slaters rule (no numericals) extra stability of half-filled and completely filled orbitals.

- (b) Nucleus and Radioactivity-I: Nuclear particles (neutrons, protons and qualitative idea of mesons and pisons); mass defect and nuclear binding energy (including numericals); packing fraction; natural and artificial radioactivity; radioactive disintegration series; first order rate equation of radioactive disintegration; half life and average life period, group displacement law, unit of radioactivity; neutron-proton ratio and its implications, importance of radioactive isotopes, elementary concepts of fusion and fission.
- (c) Chemical Periodicity: Long form of periodic table, modern periodic law, types of elements on the basis of electronic configuration; periodic variation in properties atomic and ionic radii, ionization enthalpy, electro gain enthalpy, and electro negativity(pauling's Mulliken and Alfred-Rochow Scale); diagonal relationship.

Unit II

- (a) Covalent Bonding: Basic idea of valence bond theory and its limitations; Concept of hybridization of orbitals; valence shell electron pair repulsion (VSEPR) theory and shapes of molecules and ions: BeF₂, BF₃, H₃O⁺, NH₃, H₂O, H₂S, O₃, CO₂, BO₃³⁻, PCl₃, PCl₅, SF₄, SF₆; polarity of covalent bonds and dipole moment. LCAO-MO theory and its application to homonuclear diatomic molecules (H₂, N₂, O₂, O₂⁻², O₂⁻, O₂⁻¹, Ne).
- (b) Ionic Bonding: Ionic structures; radius ratio effect; limitation of radius ratio rule; concept of lattice energy and Born-Haber cycle; polarizing power; polarizability of ions and Fajan's rule.

(c) Bonding in Metals, Semiconductors and Hydrogen Bond: Qualitative idea of free electron theory and band theory in solids; elementary ideas on semiconductors (n and p types); hydrogen bonding – concept and types of H-bonding – application to inorganic molecules

Section 2 (Organic) 19 Marks

Unit III 9½ marks

(a) Structure, Bonding & Properties: Hybridisation of orbitals, implications of hybridisation on the concept of bond length, bond energy, bond angles, shape of the molecules with following examples: (i) CH₄, H₃O+, CH₃-, RNH₂; (ii) C₂H₄, CH₃⁺, BF₃, AlCl₃, carbonyl compounds, and (iii) C₂H₂, R-CN, allene, ketene.

Nature of covalent bond and its orbital representation in molecules listed above.

Bronsted-Lowry and Lewis concepts of acids and bases, pKa and pKb concept, electronegativity, inductive effect and its role in substituted aliphatic carboxylic acids, effect of H-bonding on boiling point and solubility of organic compounds.

Conjugation, resonance, hyper-conjugation (propene and toluene), homolytic and heterolytic bond cleavage, Curly Arrow rules. Types of reagents – electrophiles and nucleophiles. Reactive intermediates: carbocations, carbanions, free radicals, carbenes - stability and examples.

(b) Organic Stereochemistry-I: Concept of isomerism, types of isomerism - configurational and conformational isomerism (ethane and butane). Fischer, Newman and sawhorse projections with suitable examples, geometrical isomerism, configuration of geometrical isomers, E and Z nomenclature, geometric isomers of oximes; optical isomerism – optical activity, chiral carbon atom, enantiomers, diastereomers, meso compounds, racemic mixture, resolution of racemic mixtures.

Unit IV 9½ marks

(a) Alkanes and Cycloalkanes: Nomenclature, methods of formation (with special reference to mechanism of Kolbe, Wurtz, Wurtz Fittig, Corey-House reactions), chemical reactivity (oxidation,

cracking, aromatization). Mechanism of chlorination, relative reactivity of halogens towards different types of alkanes).

General method of preparation of cycloalkanes (upto cyclohexane) and their rection with halogens and HX. Baeyer's strain theory- its limitations and modifications.

- (b) Alkenes and Alkynes: Nomenclature of alkenes, chemical reactivity, mechanisms of hydrogenation, bromination, Markownikoff's rule and anti Markownikoff's rule, hydration, halohydration, hydroboration, oxidation, epoxidation, ozonolysis, hydroxylation. Polymerization. Nomenclature, structure and bonding in alkynes, methods of formation, chemical reactivity, electrophilic addition reactions (halogenation, hydration, HX, HOX), ozonolysis, alkynides (Na, Cu and Ag) and polymerization; compare acidity of ethane, ethene and ethyne (hybridization concept).
- (c) Aromatic Hydrocarbons and Aromaticity: Molecular orbital picture of benzene, resonance energy, aromaticity, Huckel's (4n+2) rule and its application to simple molecules and ions, electrophilic, substitution reactions in aromatic hydrocarbons and general pattern of the mechanism, effect of substituent groups (activating and deactivating groups, directive influence) mechanism of nitration, sulphonation, halogenation nuclear and side chain, formylation (Gattermann and Gattermann-Kotch), Friedel-Craft's alkylation and acylation.

Section 3 (*Physical-I*)

18 Marks

Unit V 9 Marks

- (a) *Gaseous State-I*: Kinetic theory of gases postulates of kinetic theory, collisions and gas pressure, average kinetic energy, root mean square speed and absolute temperature of gas, Boltzmann constant, gas laws and kinetic theory. Real gases-deviation from ideality, compressibility factor, van der Waals equation of state, virial equation of state.
- (b) **Liquid State-I:** Qualitative description of the structure of liquids, Physical properties of liquids vapour pressure, surface tension, viscosity, refractive index (definitions and descriptions), Liquid crystals- elementary discussion on structure and types of liquid crystals.

Unit VI 9 marks

- (a) **Solid State-I:** Law of constancy of interfacial angles, crystal planes, law of rational indices, Miller indices, space lattice and unit cell, packing in crystals, point defect in crystal-vacancy defect, interstitial defect, Frenkel and Schottky defect.
- (b) Chemical Kinetics-I: Rate of reaction and rate constant, molecularity and order of a reaction, zero order reaction, differential and integrated forms of rate equations of first and second order reactions, pseudo-unimolecular reactions, determination of order of reactions, effect of temperature on reaction rates and energy of activation, effect of catalyst.

Chem EH 101 Part B: Practical (Organic LC-I) 25 Marks (6:19)

Laboratory Course (Organic Chemistry)							
Total Time Practical Exams: 6 hours							
1. Qualitative Analysis	12 marks						
Systematic qualitative analysis of organic compounds containing one functional group:							
 (a) Detection of elements (N, Cl, Br, I) (b) Determination of one of the following functional groups (with systematic -COOH, -NH₂, -NO₂, -OH (phenolic), -CHO and -CO- (c) Preparation of the derivative 	reporting)						
2. Viva Voce	5 marks						
3. Laboratory Record (Internal Assessment)	2 marks						
Chem H 101: Practical (<i>Organic – LC-I</i>) Laboratory Course (Organic Chemistry) 25 Mar	rks (6:19)						
Total Time Practical Exams: 6 hours							
1. Qualitative Analysis	12 marks						
Systematic qualitative analysis of organic compounds containing two function	nal groups:						
(a) Detection of elements (N, Cl, Br, I and S)							
(b) Determination of any two of the following functional groups present single organic compound (with systematic reporting)	in a						
-COOH, -OH (phenolic), -CHO, -CO-, -NH ₂ , -NO ₂ , -CONH ₂ , -SO ₃ H							
(c) Determination of the melting point/boiling point of the compound							
(d) Identification of the compound with help of a reference book							
(e) Preparation of the derivative and determination of its melting point							
2. Viva Voce	5 marks						
3. Laboratory Record (Internal Assessment)	2 marks						

Note: Chem EH 101 Part B and Chem H 101 have different question papers.

Second Semester Total: 100 Marks

Chem EH 201

PART A Inorganic, Organic & Physical Theory

75 marks (19:56)

Section 1 (*Inorganic*)

25(6:19 marks

Unit I 9 ½ marks

(a) **Principles of Qualitative and Quantitative Analysis**: Solubility product and its applications in the Group separations of cations (numerical on solubility products), Volumetric analysis – standard solutions, primary standards, expressing concentrations of standard solutions, redox titrations (potassium permanganate, potassium dichromate, sodium thiosulphate and iodine), iodometric and iodimetric titrations, acid-base indicators and its theory.

(b) *Acid-Base Concept*: Arrehenius and Bronsted-Lowry concept, the solvent-system (Franklin) concept and its limitations; Lewis concept; effect of solvent on relative strengths of acids and bases – leveling effect; Relative strengths of acids and bases (pK_a and pH concept), SHAB principle.

Unit II 9 ½ marks

- (a) **Redox Reactions**: Electronic concepts of oxidation and reduction, oxidation number, common oxidants and reductants, balancing of redox reactions by ion electron method, calculation of equivalent weights of oxidants and reductants, standard electrode potential, electrochemical series and its application.
- (b) **Some Concepts of Metallurgy**: Minerals and ores, principles and methods of extraction concentration, oxidation, reduction, electrolytic method and refining, occurrence and principles of extraction of aluminium, copper and iron.

(c) Industrial Chemistry

- (i) Fertilizers Nitrogen fertilizer, manufacture of ammonia, and urea. Phosphatic fertilizers
 calcium superphosphate, and NPK fertilizers.
- (ii) Cement constituents, manufacture and setting process, role of gypsum.

Unit III 9 ½ marks

(a) *Nucleophilic Substitution Reactions*: Nucleophile, ambident nucleophile, SN^{l} , SN^{2} , SN^{l} , factors affecting substitution reactions (structure of substrate, nature of nucleophile, solvent, role of leaving group), mechanism and stereochemistry of substitution reactions difference between nucleophile and bases.

- (b) *Elimination reactions*: E¹, E², E¹cB mechanisms, orientation in elimination reactions (Saytzeff's and Hoffmann's rules).
- (c) *Alkyl Halides*: Preparation and reactions (hydrogenolysis, aqueous and alcoholic KOH, NH₃, carbon nucleophiles, sulphur nucleophiles, KCN, AgCN, KNO₂, AgNO₂, RCOOAg, RONa, Mg, Li, Na).
- (d) *Aromatic Halogen Compounds*: Introduction, preparation and chemical reactivity, nuclear and side chain halogenation, electrophilic and nucleophilic substitution in aromatic halogen compound(bimolecular displacement, benzyne mechanism).

Unit IV 9½ marks

(a) **Alcohols:** Classification and nomenclature, method of preparation (hydration, hydroboration-oxidation and oxymercuration-reduction), reaction of alcohols (acidic nature, esterification) distinction between primary, secondary and tertiary alcohols (Victor Meyer's test, Lucas test), Oxidation by $K_2Cr_2O_7$ and metallic Cu.

Glycol: preparation from alkenes using KMnO4 and from epoxide, chemical reactions of glycol HNO₃, HCl, PX₃, Oxidation by lead tetra acetate and HIO₄.

Glycerol: preparation from oils/fats, reactions (HNO₃, HI, oxalic acid, KHSO₄)

- (b) **Phenols:** Nomenclature, Preparation (benzene diazonium salta and benzene sulphonic acids), physical properties and acidic character, comparison of acid strength of phenols with alcohols, effect of substituent on acidity of phenols, chemical reactions: nitration, halogenation, sulphonation, Kolbe's reaction, Reimer-Tiemann reaction, phenol-formaldehyde resin.
- (c) *Aldehydes and Ketones*: Nomenclature and structure of the carbonyl group, method of preparation of aldehydes and ketones (from alcohols, acid chloride, Rosenmund reaction, Gattermann-Koch), chemical reactivity of carbonyl group, mechanism of nucleophilic additions and addition-elimination reactions with HCN, NaHSO₃, NH₂OH, NH₂-NH₂, C₆H₅NHNH₂,

NH₂CONHNH₂) and Cannizzaro reaction; acidity of α-hydrogen in carbonyl compounds and formation of enolates, aldol condensation, Perkin reaction and reactions with Grignard reagents, benzoin condensation, reduction and oxidation reactions (Clemmensen and Wolff-Kishner reductions).

Unit V 9 marks

(a) *Thermodynamics-I*: Definition of thermodynamic terms- system and surrounding, types of systems, intensive and extensive variables, types of processes- isothermal, adiabatic, isobaric, reversible, irreversible and cyclic processes; Thermodynamic functions- state variables and exact differentials, concept of heat and work, path functions and inexact differentials, zeroth law of thermodynamics, work done during reversible volume change of ideal gas.

First law of thermodynamics: Statement, internal energy, enthalpy, heat capacity at constant pressure (C_p) and volume (C_v) , relation between C_p and C_v . Limitations of first law, spontaneous processes, statements of second law. Joule-Thomson Coefficient and Inversion temperature.

(b) *Macromolecules:* Characteristics of macromolecules; degree of polymerization; concepts of number and weight average molecular mass; determination of molecular mass by osmometry and viscometry.

Unit VI 9 marks

- (a) **Thermochemistry:** Exothermic and endothermic reactions, Hess's law of constant heat summation, enthalpy of formation, standard state, enthalpy of combustion, enthalpy of neutralization, enthalpy of solution, enthalpy of dilution, Kirchoff's equations- influence of temperature on ΔH and ΔU of a reaction
- (b) Adsorption and Surface Phenomena: Physisorption and chemisorption, adsorption isotherms, derivation and application of Langmuir adsorption isotherm, Freundlich adsorption isotherm.

Chem EH 201

PART B Practical (Physical)

25 Marks (6:19)

Laboratory Course (Physical)

The following experiments are to be carried out in the class. In the examination, each student should be asked to do any **one** experiment from this list given below.

List of Experiments

- (1) Determination of the heat of neutralization of a strong acid by a strong base.
- (2) Determination of molecular weight by Rast's method
- (3) Study of the heat of dilution of H₂SO₄ and then to determine the strength of an unknown acid.
- (4) Determination of the velocity constant of the decomposition of hydrogen peroxide in presence of ferric chloride as catalyst by titrating against KMnO₄.
- (5) Determination of the solubility of BaCl₂/NaCl at two different temperatures and to determine the heat of solution.
- (6) Determination of the velocity constant of the hydrolysis of methyl acetate catalyzed by an acid.

Assignment of Marks

Experiment : 12 Marks
Viva Voce : 05 Marks
Laboratory Record : 02 Marks

Third Semester Total: 100 Marks

Chem EH 301

PART A Inorganic, Organic & Physical Theory

75 marks (19:56)

Section 1 (Inorganic)

25(7:18) marks

Unit I: s- and p-Block Elements and Their Compounds

9 marks

Group discussion of the elements with respect to position in the periodic table, electronic configuration, atomic and ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, oxidation states, variation of acidic and basic properties of their oxides and oxy-acids, inert pair effect and catenation.

Preparation, important reactions, structure and use of the following compounds: sodium thiosulphate. Potassium iodide, boric acid, aluminium chloride, lithium aluminium hydride, hydrazine, and lead tetraacetate.

Unit II: d- and f-Block Elements

9 marks

Electronic configuration of d-block elements, Transition metals-defination and characteristic features of transition metals, relative stability of oxidation states, variation of properties in first, second and third row transition metals.

Electronic configurations of lanthanides and actinides, comparison of their oxidations states, synthetic elements (synthesis of Np and Pu), variation in their atomic and ionic radii – lanthanide contraction, difficulty in the separation of lanthanides – and ion exchange method of separation.

Preparation, important reactions, structures and uses of nickel tetracarbonyl, potassium ferricyanide, potassium dichromate, potassium permanganate, and uranium hexafluoride.

Section 2 (Organic) 25(6:19) marks

Unit IV 9½ marks

(a) Carboxylic Acids and their Derivatives: Nomenclature, effect of substituents on the acidity of aliphatic and aromatic carboxylic acid, methods of preparation, chemical reactivity, reactions of oxalic acid, succinic acid and citric acid. Preparation and properties of acid chlorides, amides, esters and anhydrides.

- (b) *Organometallic Compounds-I:* Grignard reagents: Synthesis of alkanes, alcohols, acids, aldehydes, ketones, amines with mechanism. Organolithium compounds: preparation and reactions with H_2O , CO_2 & epoxide.
- (c) *Active Methylene Compounds*: Active methylene group, examples of active methylene compounds, tautomerism, difference between tautomerism and resonance (keto-enol tautomerism). Synthetic use of ethyl acetoacetate and diethyl malonate.

Unit V 9½ marks

- (a) *Nitro Compounds (Aliphatic and Aromatic)*: Preparation, properties (aliphatic)—α—hydrogen acidity, halogenation, reaction with NaOH, HNO₂, hydrolysis, carbonyl compounds. Reduction of aromatic nitro compounds (aliphatic and aromatic)
- (b) *Amines (Aliphatic and Aromatic):* Nomenclature and structure of amines, preparation of amines, basicity and effect of substituents on basicity, chemical reactivity- acylation, action of nitrous acid, action of CS₂, carbyl amine reaction, condensation with carbonyl groups and ring substitution. Distinction between primary, secondary and tertiary amines and their separation.
- (c) *Diazo Compounds*: Preparation and stability of diazo compounds (aliphatic and aromatic). Reactions of benzene diazonium chloride. Preparation and reactions of diazomethane.

Section 3 (Physical) 19 marks

Unit VI 9½ marks

(a) **Thermodynamics-II:** Carnot cycle and its efficiency, Carnot's theorem, Entropy (S) as a state function, entropy changes of ideal gases in different processes. Gibbs function (G) and Helmholtz function (A), criteria for thermodynamic equilibrium and spontaneity, variation G

and A with pressure, volume and temperature, Gibbs-Helmholtz equation, Clausius-Clapeyron equation, Trouton's rule.

(b) *Chemical Equilibrium:* Law of mass action, equilibrium constant (K) from thermo-dynamic considerations, temperature and pressure dependence of equilibrium constants $(K_p \text{ and } K_c)$ – van't Hoff equation, relation of K_p and K_c , equilibria in homogeneous and heterogeneous systems, Le Chatelier's principle.

Unit VII 9½ marks (a) Dilute Solutions: Colligative properties, Raoult's law and Henry's law, relative lowering of vapor pressure, elevation in boiling point, depression in freezing point, osmosis, osmotic pressure and its determination, relation between colligative properties and molecular mass, determination of molecular mass, van't Hoff factor, abnormal molar mass, Reverse osmosis and its applications.

(b) Colloids: Classification of colloids, preparation of colloids – peptisation, Bredig's method and condensation methods, purification of colloids, properties of colloids – Tyndall effect, Brownian movement, electrophoresis and electro-osmosis, protective colloids and gold number.

Chem EH 301

PART B Practical (Inorganic-LC-I)

25 marks (6:19)

Laboratory Course (Inorganic)

Total Practical Examination Time: 6 hours

Part I: Qualitative Analysis

12marks

Inorganic Mixtures containing five radicals/ions to be analyzed – one of the radicals /ions must be interfering (borate, chromate or phosphate). Following ions/radicals to be included:

$$Ag^{+}, Pb^{2+}, Hg_{2}^{2+}, Hg^{2+}, Cu^{2+}, Cd^{2+}, Bi^{3+}, As^{3+}, Sb^{3+}, Sn^{2+}, Sn^{4+}, Fe^{2+}, Fe^{3+}, Al^{3+}, Ba^{2+}, Cr^{3+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Mg^{2+}, K^{+}, NH_{4}^{+}.$$

Part II:

(a) Sessional Work : 2 marks

(b) Viva Voce : 5 marks

Fourth Semester Total: 100 Marks

Chem EH 401

PART A Inorganic, Organic & Physical Theory

75 Marks (19:56)

Section I (Inorganic) 25 (7:18 marks)

Unit I 9 marks

- (a) *Organometallic Chemistry-I:* Definition and classification; synthesis, properties, nature of bonds, structure and application of one organometallic compound each of lithium (Methyl Lithium) magnesium (Grignard reagent).
- (b) *Inorganic Polymers:* General properties of Inorganic polymers and distinction from organic polymers; synthesis, structural aspects and uses of silicones, phosphonitrilic halides, phosphazenes, and tetrasulphurtetranitride.
- (c) *Interhalogens, Polyhalides and Pseudohalides* types of interhalogens and their reactivity, polyhalides of iodine, definition of pseudohalides study of CN⁻, SCN⁻, structure of ClF₃, BrF₅ and IF₇.

Unit II 9 marks
Werner's Coordination theory, coordination number, ligands and their classification, chelation, applications of chelate formation; nomenclature of coordination compounds, effective atomic number rule, isomerism in coordination compounds, geometrical and optical isomerism in 4- and 6-coordinate complexes; Sidgwick's effective atomic number rule; stereochemistry of complexes. with coordination numbers 4 and 6 bonding in transition metal complexes: valence bond theory

Section 2 (Organic) 19 marks

and elementary idea of crystal field theory for octahedral and tetrahedral complexes.

Unit III 9½ marks

(a) *Carbohydrates*: Classification, monosachharides glucose and fructose, Fisher Projection formula, reaction of glucose and fructose with Br₂-water, HCN, Tollen's reagent, Fehling's solution, hydroxylamine, phenylhydrazine, HNO₃ and osazone formation. Determination of ring size by HIO4 method. Haworth projection formula, conformational structures of glucose and fructose

Epimerization, inter-conversion of aldoses and ketoses. Ascending (Kiliani) and descending series (Wohl).

Disaccharides: Sucrose and maltose, elucidation of structure, hydrolysis, reducing/non-reducing, polysaccharides: structure of cellulose, starch (details not required).

- (b) Amino Acids: Classification, synthesis of α -haloacids and Gabriel syntheses of glycine, alanine, phenyl alanine; glutamic and aspartic acids. Physical properties, isoelectric points and zwitterionic structure.
- (c) *Urea*: Preparation of urea, reactions of urea with HNO₃, H₂O, HNO₂, NaOBr, CH₃COCl, C₂H₅OH, NH₂NH₂ and diethyl malonate, formation of biuret.
- (d) **Drugs:** Classification of drugs as antipyretic, analgesic, antibacterial, antiviral, antibiotic, sulpha drugs and tranquilizer with one example each. Synthesis and use of aspirin, paracetamol, sulphaguanidine, barbituric acid.

Unit IV 9½ marks

- (a) *Heterocyclic Compounds-I:* Introduction; molecular orbital picture, aromatic characteristics and resonance, preparation (Paal-Knorr synthesis, synthesis of furan from pentose and pyrrole from furan) comparison of chemical reactivity (Diels Alder reaction and diazo coupling), electrophilic substitution reactions (nitration, sulphonation, Friedel crafts) of pyrrole, furan and thiophene. Structure, synthesis and reactions of pyridine (electrophilic, nucleophilic substitutions), comparative basicity of pyrrole/ pyridine, pyrrole/ pyrrolidine and pyridine/ piperidine.
- (b) *Fats, Oils, Soaps and Detergents:* Animal and vegetable oils, drying and non-drying oils, hydrogenation, iodine value, RM value and saponification value, soaps and detergents, mechanism of cleansing action of soap and detergents.
- (c) *Dyes*: Relationship between colour and constitution, chromophore and auxochrome, classification of dyes (based on structure and application), syntheses of methyl orange, Bismarck brown, Malachite green and phenolphthalein.

Section 3 (*Physical*)

19 marks

Unit V 9½ marks

Ionic Equilibrium: Arrhenius theory of electrolyte dissociation and limitations. Ostwald's

dilution law and its uses, dissociation equilibria of weak electrolytes, dissociation constant of weak acids (K_a), ionic product of water (K_w), hydrogen ion. concentration and pH scale, buffer solutions and buffer activity, hydrolysis constant (K_b), relation between K_a , K_w and K_b , derivation of hydrolysis constant for salts of (i) strong acid and weak base, (ii) weak acid and strong base and (iii) weak acid and weak base, solubility product, common ion effect.

(b) *Electrochemistry-I*: Electrical transport –conduction in metals and in electrolyte solutions, specific conductance, equivalent and molar conductances and their determination, variation of equivalent and specific conductance with concentration of strong and weak electrolytes. Migration of ions and Kohlrausch law, transport numbers and their determination using Hittorf's and moving boundary methods. Conductometric titrations (acid bases).

UNIT VI 9½ marks

- (a) *Electrochemistry-II:* Electrochemical cells. Half cells: types and examples; types of reversible electrodes; Electrode reactions; Nernst equation and standard electrode potentials; reference electrodes (Hydrogen and calomel electrodes); sign conventions; electrochemical series.
- (b) **Phase Equilibria:** Phase rule and meaning of the terms phase, components and degrees of freedom, equilibrium between phases, phase diagram for one component systems (water and sulphur systems), Typical phase diagrams of two component systems involving eutectic (KI-H₂O), congruent (phenol-aniline) and incongruent (NaCl-H₂O) melting points.

Liquid-liquid mixtures, fractional distillation of binary miscible liquids, azeotropes (ethanol-water system), partial miscibility of liquids, lower and upper critical solution temperatures (triethylamine-water, phenol-water and nicotine-water systems), steam distillation, Nernst distribution law – derivation and its application.

Chem EH 401

PART B Practical (Inorganic-II)

25 Marks (6:19)

Laboratory Course (Inorganic)

Total Practical Examination Time: 6 hours

Section 1: Quantitative Analysis

12 marks

Volumetric Estimation: Redox titration involving potassium permanganate, and potassium dichromate for the estimation of Fe²⁺, Fe³⁺ and Ca²⁺ and iodometric estimation of Cu²⁺.

Section 2:

(a) Sessional Work: 2 marks

(b) Viva Voce: 5 marks

Chem H 501 50 Marks (12:38)

Total: 200 Marks

PART A Inorganic Theory

Unit I 7 marks

(a) *Molecular Symmetry*: Symmetry elements and symmetry operations: symmetry planes and reflections, inversion center, proper axis and proper rotations, improper axis and improper rotations; molecular point groups; systematic classification of molecules into point groups with examples $\{(i) \text{ linear molecules}, (C_{\infty v}, D_{\infty}h), (ii) \text{ molecules with no } C_n \text{ or } S_n, (C_s \text{ and } C_1 \text{ only}), (iii) \text{ molecules with cubic point group, } (T_d \text{ and } O_h), (iv) H_2O, NH_3, XeOF_4, XeF_4, PF_5, B_2H_6, Cyclohexane (chair and boat forms)}.$

Unit II 8 marks

- (a) Complexometric titration (using EDTA), metal ion indicators, masking and demasking reagents; principles of argentometric titrations, estimation of chloride using adsorption indicators; principles of gravimetric estimation of chloride, theory of precipitation, coprecipitation, post-precipitation and digestion of the precipitate.
- **(b)**Error Analysis: Significant figures; errors, types of error (determinate and indeterminate); accuracy and precision; normal distribution of indeterminate errors; propagation of errors mean and standard deviations; rejection of data the F-test, t-test and Q-test.
- (c) Organic Reagents in Inorganic Analysis: Basic qualities of the reagents and conditions; advantages of organic precipitants and their limitations; study of Oxine, α -nitroso β -naphthol, cupferron, cupron, and dimethylglyoxime.

Unit III 8 marks

Nucleus and Radioactivity-II: Types of radioactive decay; radioactive equilibrium; spontaneous fission, nuclear reactions, Q value, principles of separation of isotopes – gaseous diffusion, electrolysis and electromagnetic separation methods; application of radioisotopes as tracers; detection and measurement of radioactivity (GM counter).

Stability of nucleus and nuclear forces, magic number concept, nuclear binding energy; Basic principles and types of nuclear reactors;

Unit IV 7 marks

Crystal Field Theory (CFT): d-orbital splitting by electrostatic field (octahedral, tetrahedral and affecting crystal field splitting energy (10Dq value), and spectrochemical series, Structural and thermodynamic effects of d-orbital splitting, variation of ionic radii, Jahn-Teller effect, hydration and lattice energies of first row transition metal ions; octahedral vs. tetrahedral coordination; adjusted CFT and molecular orbital theory for octahedral complexes.

Unit V 8 marks

Magnetochemistry: Explanations of diamagnetism, paramagnetism, ferromagnetism and antiferromagnetism, origin of paramagnetic moment: electron spin moment and orbital angular moment, magnetic susceptibility, Curie law, Curie-Weiss law, Bohr magneton, magnetic susceptibility measurement by Gouy and Faraday methods; explanation of magnetic behaviour of $K_4[Fe(CN)_6]$, $K_3[Fe(CN)_6]$, $[Co(NH_3)_6]Cl_6$, $K_2[Ni(CN)_4]$, $K_3[CoF_6]$, $K_3[MnF_6]$, $Ni(CO)_4$.

Chem H 502 Organic chemistry 50 Marks (13:37)

Unit I 9 marks

- (a) **Polynuclear Aromatic Hydrocarbons:** Introduction; molecular orbital structure of naphthalene; resonance; Preparations, reactions, mechanism and orientation of electrophilic substitution. Preparations and reactions of α and β -naphthols (azo-coupling, reactions with HNO₂ and FeCl₃. Preparation and reactions of Anthracene.
- (b) Peptides, Proteins and Vitamins: (i) Peptides definition and preparation of di- and tripeptides from α-amino acids.
 - (ii) Proteins introduction, classification, primary, secondary, tertiary and quarternary structures of proteins, α and β -proteins, helical and sheet structures.
 - (iii) Vitamins definition, classification and biological importance of vitamins. Carotenoids occurrence, isolation and synthesis of β -carotene as a source of vitamin A_1 , synthesis of vitamin A_1 and ascorbic acid.

Unit II 9 marks

(a) *Organic Stereochemistry-II*: Nomenclature of enantiomers (R and S); relative and absolute configuration; inversion, retention, conformation cyclic compounds – cyclohexane, mono-substituted and disubstituted cyclohexanes (1,2-, 1,3-, 1,4-) with reference to their relative stability both Newmann and chair form. Streo chemical aspects of bromine to alkenes.

- (b) *Introduction to Dienes*: Conjugated, isolated and cumulated dienes (allenes); preparations and reactions of conjugated dienes (1,3-butadiene and isoprene). Addition reaction of 1,3-dienes (1,2 and 1,4).
- (c) *Polymers*: Types of polymers and polymerization processes. Addition (chain-growth) polymerization; free radical vinyl polymerization; ionic vinyl polymerization [Ziegler–Natta polymerisation]. Condensation (step-growth) polymerization, polyesters (Dacron), polyamides (Nylon-6, Nylon -6,6), urea- formaldehyde resins (Bakelite), polyurethanes. Natural and synthetic rubbers (Neoprene, Buna-S, Butyl rubber).

Unit III 9 marks

- (a) *Introduction to Organic Synthesis*: Formation of carbon-carbon bond, electrophilic and nucleophilic carbon species, acid-assisted reaction (Friedel Crafts alkylation and acylation, Gatterman-Koch formylation), base assisted condensations (Knoevenagel, Michael, Wittig reaction, Claisen reaction, Claisen-Schmidt reaction, Mannich reaction).
- (b) *Rearrangements*: Carbocation rearrangements pinacole-pinacolone, Wagner-Meerwein, dienone-phenol. Beckmann, Wolff, Hofmann, Curtius, Lossen, Schmidt, benzil-benzilic acid, benzidine-semidene, Favorskii, Fries and Claisen rearrangements.

Unit IV 10 marks

- (a) *Heterocyclic Compounds-II*: Introduction to condensed five- and six-membered heterocycles, preparation and reactions of indole, quinoline and isoquinoline with special reference to Fischer-Indole synthesis, Skraup and Bischler-Napieralski syntheses.
- (b) *Green Chemistry*: Definition, goals, principles and techniques (brief discussions); Solvent free reactions, Microwave assisted reactions (their advantages over conventional method with examples).
- (c) *Inorganic Reagents in Organic Synthesis*: NaBH₄, LiAlH₄, B₂H₆, Na/liq.NH₃, aluminium isopropoxide, KMnO₄, K₂Cr₂O₇, HIO₄, Lead tetraacetate, peracids.

Chem H 503

PART A Physical Theory

50 Marks (13:37)

Unit I: Gaseous State-II 9 marks

Maxwell's distribution law of molecular speeds, molecular speeds and energy distribution as a function of temperature, calculation of the most probable, average and root mean square speeds of molecules, Maxwell-Boltzmann distribution, degrees of freedom of motion, principle of equipartition of energy, collision diameter, collision cross-section, collision frequency and mean free path, viscosity of gases, Boyle temperature, critical phenomena-critical constants, p-v isotherm of carbon dioxide, continuity of state, law of corresponding states and reduced equation of state, vapour density and limiting density.

Unit II: Physical properties and molecular stucture

7 marks

Determination of surface tension, viscosity and refractive index of liquids. Physical properties and chemical constitution- additive and constitutive properties, molar volume, parachor, specific and molar refraction. Polar and non-polar liquids, dielectric constant, dipole moment, structure of molecules, polarization, Clausius-Mossotti equation. Dipole induced dipole and vander Waals interactions in molecules.

Unit III: Solid State-II 6 marks

Symmetry elements in crystals-plane of symmetry, axis of symmetry, centre of symmetry, seven crystal systems, Law of symmetry, Bravais lattices, X-ray diffraction of crystals, Bragg's law, crystal structure determination-Laue's method and powder method.

Unit IV: Chemical Kinetics-II

7 marks

Catalyzed reactions – homogeneous catalysis, acid-base catalysis, enzyme catalysis - Michaelis-Menten equation; Theory of Reaction rates – collision theory, transition state theory of unimolecular reactions.

Complex reactions – opposite, parallel, consecutive and chain reactions, rate determining step, steady state approximation and derivation of rate laws of complex reactions.

Unit V: Molecular Spectroscopy

8 marks

Introduction: electromagnetic radiation, regions of the spectrum, basic features of different spectrometers, statement of the Born-Oppenheimer approximation, degrees of freedom.

Rotational and Vibrational spectra of diatomic molecules: frequency expressions, selection rules and applications to estimate molecular parameters; isotope effect in vibrational spectrum. Beer Lambert's Law, Einstein's Law.

Chem H 504 PART A (Practical – Organic LC-II)

25 Marks (6:19)

Laboratory Course (Organic)

Total Time for Practical Exams: 6 hours

1. Separation of Mixtures

6 marks

- (a) Separation of binary organic mixtures based on acid-base concept
- (b) Determination of melting points
- 2. Organic Preparation

6 marks

- (a) Preparation of the following compounds
 - (b) Phthalimide (from phthalic anhydride)
 - © m-Dinitrobenzene (from benzene)
 - (d) Picric acid (from phenol)
 - (e) p-Bromoacetanilide (from acetanilide)
 - (f) Benzilic acid (from benzil)
 - (g) Methyl Orange (from sulphanilic acid)

3. Viva Voce	5 marks
4. Laboratory Record (Internal Assessment)	2 marks

Chem H 504 PART B (Practical – Physical LC-II) 25 Marks (6:19)

Laboratory Course (Physical)

Total Practical Examination Time: 6 hours

The following experiments are to be carried out in the class. In the examination, each student should be asked to do any **one** experiment

List of Experiments

- (a) Conductometric titrations of an acid by a base.
- (b) Acid-base titration using potentiometer.
- © Verification of Beer-Lambert's law using copper sulfate or K₂Cr₂O₇ solution colorimetrically and determination of the concentration of the supplied solution
- (d) Determination of velocity constant for the decomposition of hydrogen peroxide using ferric chloride as catalyst; and to determine the activation energy.
- (e) Determination of the heat of solution of solid calcium chloride and to determine lattice with the help of Born-Haber cycle.
- (f) Determination of the critical solution temperature of the phenol-water system.
- (g) Study on the kinetics of the reaction between potassium persulfate and potassium iodide at two temperatures with determination of activation energy (h)Study of the adsorption of oxalic acid on charcoal and verification of Freundlich's adsorption isotherm.
- (i) Determination of surface tension of a liquid/solution by drop-weight method.
- (j) To obtain the viscosity–composition (v/v) curve of ethanol-water/ glycerol-water/ methanol-water system and to determine the composition (v/v) of a given unknown mixture.
- (k) Determination of partition coefficient of a solute between two immiscible solvents (e.g. iodine in water/organic solvent; benzoic acid in water/benzene).
- (l) Determination of pKa value of different sets of buffer by pH-metric titration using glass electrode

(cont	'd				

Distribution of marks:

Viva Voce : 05 Marks

Laboratory Record : 02 Marks

Experiment : 12 Marks

Sixth Semester Total: 200 Marks

Chem H 601

PART A Inorganic Chemistry 50 Marks (12:38)

Unit I: Organometallic Chemistry-II

10 marks

 $Synthesis, properties, nature of bonds, structure and application of organometallic compounds of lithium (alkyl and aryl), magnesium (RMgX and MgR_2), iron (ferrocene) and tin (R_3SnX,$

R₂SnX₂ types); metal-ethylenic complexes and homogeneous hydrogenation;

Π-acid ligands, mononuclear and dinuclear carbonyls and nitrosyls and the nature of bonding in them – their uses in metallurgy; Important applications of organometallic compounds in heterogeneous catalysis – hydrogenation of alkenes using Wilkinson's catalyst and synthesis of acetic acid using rhodium carbonyl iodide catalyst.

Unit II: Bioinorganic Chemistry

10 marks

Essential and trace elements in biological processes, criteria of essential elements, metalloporphyrins, structure, and functions of haemoglobin, myoglobin and chlorophyll; role of Fe and Mg in haemoglobin and chlorophyll, role of Co in vitamin B₁₂, Carbonic anhydrase, its characteristics and functions,. Non-complexing cations in biochemical processes, Na⁺-K⁺ pump; Toxic effects of metal ions with reference to mercury, lead, beryllium and aluminum; deficiency of Fe, Ca, Mg and iodine; Platinum complexes as anti-cancer drugs.

Unit III: Spectroscopic Methods in Inorganic Chemistry

6 marks

Application of the following techniques for Inorganic and Coordination compounds:

- (a) *UV-Visible Spectroscopy:* Free ion terms and their splitting in octahedral symmetry, Selection rules, Orgel diagrams for octahedral/tetrahedral complexes (d¹, d², d⁸, and d⁹ systems).
- (b) *IR Spectroscopy:* Basic principles, spectral studies of coordination compounds containing following molecules or ions as ligands: H₂O, CN, CO, SO₄²⁻, and halides (F, Cl, Br, I)

Unit IV 6 marks

Reactivity of Coordination Compounds: Thermodynamic stability; Stepwise formation constant, Kinetic lability and inertness, Mechanisms of Ligand displacement reactions in octahedral and square planar complexes, the *trans* effect, Determination of composition of complexes by spectrophotometric method.

Unit V 6 marks

Nanomaterials: General introduction to nanomaterials and emergence of nanotechnology, Types of nano materials, Synthesis of nanoparticles of gold, platinum and silver; properties of nanoparticles (optical, semiconductor, electrical and magnetic), important applications of nanoparticles.

Chem H 602 Organic Chemistry

50 Marks

Unit I 10 marks

- (a) *Natural Products*: (i) Terpenoids: Introduction, isoprene rule, classification, structural elucidation and syntheses of citral and geraniol. (ii) Alkaloids: Introduction, classification, physiological action, syntheses of nicotine and cocaine.
- (b) Topics in Biological Chemistry: (i) Enzymes Introduction, nomenclature and characteristics. Mechanism of enzyme action (a general picture); mechanism of action of the enzyme chymotripsin 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.
- (ii) 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.

Unit II 9 marks

(a) *Organic Photochemistry*: excitation of molecules, Franck-Condon principle, dissipation of energy, Jablonski diagram, singlet-triplet

states, fluorescence and phosphorescence, photosensitization and quenching, quantum yield. Introduction to photochemical reactions of carbonyl compounds, photoreduction. Norrish Type I and Type II cleavages. Paterno-Buchi reaction.

Unit III 9 marks

Pericyclic Reactions: Definition and scope of pericyclic reactions. (i) Electrocyclic reactions – stereochemistry, conrotatory and disrotatory ring closures and ring opening (simple examples like 1,4-disubstituted 1,3-buta-diene, 1,6-disubstituted-1,3.5-hexatriene, 1,8-disubstituted-1,3,5,7-octatetraene). Woodward-Hoffmann rules for electrocyclic reactions, frontier molecular orbital theory (correlation diagram not required). (ii) Cycloaddition reactions – Definition of dienes and dienophiles, supra-supra and antara-antara modes of cycloadditions $(\pi s^4 + \pi s^2, \pi s^4 + \pi a^2, \pi s^2 + \pi s^2, \pi s^2 + \pi a^2)$ by taking example of simple dienes and dienophiles.

Unit IV Spectroscopy for Structural Analysis

12 marks

- (a) *Ultraviolet and Visible Spectroscopy* Basic principles of UV and visible spectroscopy, application to conjugated polyenes, carbonyl compounds and α,β -unsaturated carbonyl compounds, Woodward- Fieser rules.
- (b) *Infrared Spectroscopy* Basic principles, characteristic vibrational frequencies of carbonyl compounds, hydroxyl and amino compounds.
- (c) *Nuclear Magnetic Resonance Spectroscopy* Basic principles, chemical shifts, shielding and deshielding of protons, chemically equivalent protons, PMR- peak area and proton counting. Characteristics protons chemical shifts and coupling constants for ethyl bromide, toluene, p-xylene, o-and p-nitrotoluene, anisole, ethyl alcohol, ethyl acetate, acetaldehyde and acetic acid.
- (d) Mass Spectrometry Basic principles, types of ions produced in mass spectrometer, molecular ion peak, base peak and metastable ion, fragmentation pattern, N- rule, simple application in structure elucidation(butane, isopentane, 2-butanol, ethyl propyl amine, acetone, ethyl methyl ketone, ethyl benzene), Mc Lafferty rearrangement (butanal and pentanal.

Chem H 603

Physical Chemistry

50 Marks (12:38)

Unit I

Thermodynamics-III

10 marks

Thermodynamic scale of temperature, Maxwell's relations, definition of chemical potential., concept of chemical potential, equilibrium between different phases, derivation of phase rule from the concept of chemical potential, partial molal quantities, variation of chemical potential with temperature and pressure, chemical potential of a component in an ideal mixture, Gibbs-Duhem equation.

Nernst heat theorem, third law of thermodynamics and its application to the determination of entropy, concept of residual entropy.

Unit II: Electrochemistry-III

10 marks

Activity and ionic activity coefficient; mean ionic activity. Ion atmosphere; electrophoretic and relaxation effects; Onsager equation (qualitative); Wien and Debye-Falkenhagen effects; Debye-Huckel theory (qualitative) and the limiting law. Solubility of sparingly soluble salts and ionic strength of medium. Standard cells, concentration cells (with and without transport), liquid junction potentials. EMF of a cell and its measurements. Calculation of thermodynamic parameters (Δ H, Δ G, Δ S and K) from cell EMF, polarization and over potential. Applications of Ag/AgCl, quinhydrone and glass electrodes. potentiometric titrations with examples.

Unit III: Elementary Quantum Mechanics

9 marks

Failure of classical mechanics: Black-body radiation, Planck's radiation law, photoelectric effect, Compton effect, heat capacity of solids; Postulates of quantum mechanic; Model systems (with complete derivation of wavefunction & energy expression): Particle-in one dimentional box, quantum numbers and their importance.

Unit IV: Boltzmann Distribution

9 marks

Idea of mathematical and thermodynamic probability; entropy and probability; Boltzmann distribution (without derivation) for non-degenerate and degenerate cases; application to barometric distribution formula. Molecular partition functions and its significance; Translational,

Rotational, vibrational and electronic partition functions.

Chem H 604 Total: 50 Marks

PART A: Practical (Inorganic)

25 Marks (6:19)

Laboratory Course (Inorganic Quantitative Analysis)

12

marks Total Practical Examination Time: 12 hours

Estimation (volumetric or gravimetric) of metal constituents from mixtures of Iron-Calcium, Iron-Copper, Copper-Zinc, Calcium-Barium, Copper-Nickel (separation of one metal constituent must be carried out).

Sessional Work and Viva Voce

(a) Sessional Work: 2 marks

(b) Viva Voce: 5 marks

Chem H 604 PART B: Dissertation

25 Marks

The dissertation shall be conducted internally by the Department of Chemistry of the respective colleges. The dissertation shall be conducted formally latest by the second week of March of each year. The Report for the dissertation shall be checked by the external examiner coming for Part A of Chem H 604 before sending the final marks to the exam department.

The Topic of the dissertation shall be decided by the Department and informed to the student at least 30 (thirty) days ahead of the exact date of the dissertation. Each student shall choose a topic in consultation with the Department. The topics must be from any of the subjects of contemporary interest in Chemistry. Students must submit a Write-up of the dissertation. Marks distribution shall be as follows:

1. Write-up and content : 7 marks

2 Presentation · 12 marks

3. Questions/Answers : 6 marks

Department of Chemistry

Course distribution: Syllabus 2019 (Year 2019 - Year 2022)

Outcome of the Under Graduate Course in B. Sc in Chemistry.

A student after graduation and obtaining a degree in Chemistry gains knowledge and understanding of the subject matter both theoretically and also practically and how one can handle chemicals safely. It also help in expanding their knowledge base on the subject which makes available opportunities for them to get placement in different department related to chemistry in both Government Services through Public Services Commission as well in non government organization and private sector.

After graduating from B.Sc. Course in Chemistry, this helps them get job opportunities in different related field such as food safety, health inspector, pharmaceutical industries, pharmacist, water industries, beverages industries, steel & alloys industries etc. It helps in gaining broad perspectives foundation in chemistry that stresses scientific reasoning and analytical problem solving. It helps to achieve the skills required in getting job opportunities in teaching professions such as graduation school, professional school, in chemical industries, cement factories, paint industries, agro products industries, food processing industries, petro chemical industries, fertilizer industries, pollution control board etc.

A graduate gets exposure in how to handle different experimental technique and instruments. It helps to gain knowledge and deep insight of the nature and valuable role played by metals and non metals in daily life. Knowing and understanding the basic concept of chemistry also helps in better understanding of the subjects as well namely mathematics, physics, biological sciences, agricultural sciences, medicines, environmental sciences etc. as chemistry is a subject that is inter-related to these subject. Chemistry is a subject that helps one's to gain knowledge, learn and gets exposure in laboratory skills and safety measure which can be applied while working in different fields and environment.

A students after graduating in Chemistry, he or she can opt for postgraduate in M.Sc in Chemistry, M.Sc in Pharmaceutical Chemistry, Postgraduate Diploma in Analytical Chemistry, Postgraduate diploma in Biotechnology, M.Sc in Biochemistry, M.Sc in Computational Chemistry.

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Department of Chemistry Synad College, Shillong FirstSemester

ChemEH 101: Part ATheory /Inorganic-I, Organic-I&Physical-I)-75 marks

PartBPractical(Organic LC-I)

25marks

Total:100Marks

ChemH101:Practical(Organic LC- I-Honors)

-25marks

(ChemEH101 isbothHonorsand Elective:ChemH 101ispurelyHonors)

SecondSemester

Total:100Marks

ChemEH 201: Part ATheory (Inorganic-II, Organic-II&Physical-II)-75 marks

PartBPractical(Physical LC-I)

-25marks

ThirdSemester

Total:100Marks

ChemEH 301:PartATheory (Inorganic-III, Organic-III&Physical-III)-75 marks

PartBPractical(Inorganic LC-I)

-25marks

FourthSemester

Total:100Marks

ChemEH 401: PartATheory (Inorganic-IV, Organic-IV&Physical-IV)-75 marks

PartBPractical(Inorganic LC-II)

-25marks

FifthSemester

Total:200Marks

ChemH501:InorganicChemistry-V

-50marks

ChemH502:OrganicChemistry-V

-50marks

ChemH503:PhysicalChemistry-V

-50 marks

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-25marks

ChemH504:PartAPractical(Organic LC-II)

PartBPractical(Physical LC-II)

-25marks

SixthSemester

Total:200Marks

ChemH601:Inorganic Chemistry-VI

-50 marks

ChemH602:Organic Chemistry-VI

-50marks

ChemH603:PhysicalChemistry-VI

-50marks

ChemH604:PartAPractical(Inorganic LC-III)

-25marks

PartBDissertation

-25marks

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Department of Charactry Survey College, Shiftony Note: HstandsforHonorsalone: EstandsforElectivealone; EHstandsforbothElectiveandHonors. The above assignments of Course Numbers (e.g. ChemE 201) is only tentative.

Note:H stands for Honors alone, E stands for Elective alone, EH stands for both Elective and Honors.

FirstSemester

Total:100Marks

Chem-EH101

1:3ratio

PARTA Inorganic, Organic&PhysicalTheory

75marks(19:56)

Section1

Inorganic

19Marks

Unitl

Year: 2019

- (a) Mrs L. Massar
- (b) Shri D. Kharbani
- (c) Dr. W. Kharmawphlang

Year: 2019

- (a) Dr. W. Kharmawphlang
- (b) Dr. W. Kharmawphlang
- (c) Dr. W. Kharmawphlang

Year: 2020-2022

Unit I: Dr. A. Lapasam

Unit II: Dr. W. Kharmawphlang

Section 2

Year 2019-2022

Organic

19 Marks

Unit III

Shri R. Rani

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Unit IV

- (a) Smt. L. Massar
- (b) Shri R. Rani
- (c) Mrs. L. Massar

Section 3

Year: 2019

Physical

19 Marks

Unit V

- (a) Shri N. Kharbani
- (b) Dr. S. S. Islam

Unit VI

- (a) Dr. S. S. Islam
- (b) Shri N. Kharbani

Year : 2020-2022

Unit V

- (c) Shri N. Kharbani
- (d) Smt L. Massar

Unit VI

- (c) Dr. L. Shadap/Dr. W. P. Sohtun
- (d) Shri N. Kharbani

LabCourse Organic

General Paper

25 Marks (6:19)

Practical : Shri R. Rani

Organic Practical Honours Paper : Shri R. Rani

Second Semester

Total Marks: 100

Part A

Inorganic, Organic & Physical

75 Marks(19:56)

Section I

Inorganic

19Marks

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Department of Chemistry Synod College, Shillong

Year : 2019

Unit I

- (a) Dr. W. Kharmawphlang
- (b) Dr. W. Kharmawphlang

Unit II

- (a) Mrs L. Massar
- (b) Shri D. Kharbani
- (c) (i0 Shri D. Kharbani
 - (ii) &(iii) Dr. W. Kharmawphlang

Year; 2020-2022

Unit I

- (c) Dr. W. Kharmawphlang
- (d) Dr. W. Kharmawphlang

Unit II

Dr. A. Lapasam

Section 2

Organic

19 Marks

Unit III

Shri R. Rani

Unit Iv

- (a) Mrs L. Massar
- (b) Shri R. Rani
- (c) Mrs L Massar

Section 3

Physical

19 Marks

Year: 2019

Unit V

- (a) Shri N. Kharbani & Dr. S. S. Islam
- (b) Shri N. Kharbani

Unit VI

(a) Dr. S.S. Islam

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Department of Councilly Syriod College, Shillong

(b) Shri N. Kharbani

Year 2020-2022

Unit V

- (a) Smt. L. Massar & Dr. L. Shadap/Dr. W.Sohtun
- (b) Shri N. Kharbani

Unit VI

Shri N. Kharbani

Part B Practical: Physical 25 Marks (6:19)

Lab Course: Shri N. Kharbani

Third Semester Total Marks: 100

Part A Inorganic, Organic & Physical 75 Marks(19:56)

Section I Inorganic 19Marks

Year 2019

Unit I

S-block elements : Mrs. L. Massar

p-blocks elements : Dr. W. Kharmawphlang

Unit II

Shri D. Kharbani

Unit III

Dr. W. Kharmawphlang

Year: 2020-2022

Unit I

(a) S-block elements : Dr. L. Shadap/Dr W. Sohtun p-blocks elements : Dr. W. Kharmawphlang

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Unit II

Dr. A. Lapasam

Section 2 Organic 19Marks

Unit Iv

- (a) Mrs L. Massar
- (b) Shri R. Rani

Unit V

- (a) Shri R. Rani
- (b) Shri R. Rani
- (c) Mrs L. Massar

Section 3 Physical 19 Marks

Unit V : Dr. S.S. Islam(year 2019) & Dr. L. Shadap/ Dr.W. Sohtun (2020-2022)

Unit VI: Shri N. Kharbani

Part B Practical: Inorganic I 25Marks (6:19)

Lab Course: Shri N. Kharbani & Mrs L. Massar(2019), Dr. A. Lapasam& L. Massar (2020-22)

Fourth Semester Total Marks: 100

Part A Inorganic, Organic & Physical 75 Marks(19:56)

Section I Inorganic 19Marks

Year 2019

Unit I

- (a) &
- (b) Shri D. Kharbani
 - (c) Dr. W. Kharmawphlang

Unit II : Dr. W. Kharmawphlang

Dr. Waterous H.O.D.

Consument of Chemistry
Synod College, Shillong

Year: 2020-2022

Unit I: Dr. A. Lapasam

Unit II: Dr. W. Kharmawphlang

Section 2 Organic

19Marks

Unit III

(a), (b) & (c); Shri R. Rani

(d) Mrs. L. Massar

Unit IV

(a) Shri R. Rani

- (b) Mrs L. Massar
- (c) Shri R.Rani

Section 3

Physical

19 Marks

Unit V

(a) Shri N. Kharbani

(b) Dr. S. S. Islam(2019) & Dr. L. Shadap/Dr. W. Sohtun (2020-22)

(a) Shri N. Kharbani

(b) Dr. S.S. Islam & Shri N. Kharbani(2019) & Dr. L. Shadap/Dr. W. Sohtun (2020-22)

Part B Practical (Inorganic II)

25Marks (6:19)

Lab Course : Dr. W. Kharmawphlang

Fifth Semester Total Marks : 200

ChemH 501 100 Marks (25:75)

Part A Inorganic Chemistry 38 Marks

Year 2019

Unit I

(a) Dr. W. Kharmawphlang

Or. Wancydora Knarmawphiang
H.O.D

Department of Chemistry

(b) Mrs L. Massar

Unit II

(a) Shri D. Kharbani

(b) Dr. W. Kharmawphlang

Unit III: Shri D. Kharbani

Unit IV: Dr. W. Kharmawphlang

Uint V: Dr. W. Kharmawphlang

Year 2020-2022

Unit I; Dr. W. Kharmawphlang

Unit II: Dr. A. Lapasam

Unit III: Dr. A. Lapasam

Unit IV: Dr. W. Kharmawphlang

Unit V: Dr. W. Kharmawphlang

Part B Organic Chemistry 37 Marks

UNIT I: Mrs L. Massar

Unit II : Shri R. Rani

Unit III

(a) &

(b) Mrs L. Massar

(c) Shri R. Rani

Unit IV: Shri R. Rani

Chem502 100 Marks

Part A Physical Theory 50 Marks(13:37)

Unit I: Shri. N. Kharbani

Unit II: Shri N. Kharbani(2019) & Dr. L. Shadap/ Dr. W. Sohtun (2020-22)

Unit III: Dr. S. S. Islam(2019), Dr. A. Lapasam(2020-2022)

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Unit IV: Dr. S. S. Islam(2019), Dr. L. Shadap/Dr. W. Sohtun (2020-22)

Unit V: Shri N. Kharbani

Part B Practical - Organic 25 Marks (6:19)

Lab Course: Shri R. Rani

Part C Practical Physical 25 Marks (6:19)

Lab Course: Shri N. Kharbani

Sixth Semester Total Marks : 200 Marks

ChemH 601 100 Marks (25:75)

Part A Inorganic Chemistry 50 Marks

Unit I : Shri D. Kharbani (2019), Dr. A. Lapasam (2020-22)

Unit II: Dr. W. Kharmawphlang

Unit III : Mrs L. Massar(2019), Dr. A. Lapasam (2020-22)

Unit IV: Dr. W. Kharmawphlang

Unit V : Dr. W. Kharmawphlang

Part B Organic Chemistry 50 Marks

Unit I

(a) Shri R. Rani

(b) Mrs. L. Massar

Unit II: Mrs L. Massar

Unit III: Shri R.Rani

Unit IV: Shri R. Rani

Chem H 602 100 Marks

Part A Physical Chemistry 50 Marks (12:38)

Unit I: Dr S. S. Islam(2019), Dr. L. Shadap/Dr. W. Sohtun (2020-22)

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Unit II: Dr. S. S. Islam(2019), Shri N. Kharbani (2020-22)

Unit III : Shri N. Kharbani

Unit IV: Shri N. Kharbani(2019), Dr. L. Shadap/Dr. W. Sohtun (2020-22)

Unit V: Dr. S. S. Islam & Shri N. Kharbani

Chem H 602 Part B Practical - Inorganic 25 Marks (9:26)

Lab Course Inorganic Quantitative Analysis

Dr. W. Kharmawphlang

ChemH 602 Part C Seminar 25 Marks

All Faculty Members

Dr. Wencydore Knarmenrphlang
H.O.D

Department of Chemistry
Synod College, Shillong

Department of Mathematics

Teaching Methods:

Black/ White boards, working out problems in class individually and in groups, Library work for completing assignments, one to one interaction with students to clear doubts and arrive at solutions. This was since 2017 prior to the Covid year.

With the onset of Covid-19 the teaching methods have changed to the digital forms like sharing notes in watsapp groups with respective semesters, use of Google classrooms, Google meets and creating You Tube channels.

Now in 2022, both the offline and the online methods are used.

Head

Department of Mathematics, Synod College, Shillong.

Department of Mathematics

Distribution of the Course Content:

2017-2018:

Semester-1

Unit I - I Shabong

Unit II - H G Laitthma

Unit III + Unit V - L S L Nongbri

Unit IV + Unit V - D L Jyrwa

Semester 2

Unit I - I.Shabong

Unit II +V - L S L Nongbri

Unit III - H G Laitthma

Unit IV + Unit V - D L Jyrwa

Semester - 3

Unit I - I.Shabong

Unit II - H G Laitthma

Unit III + Unit V - D L Jyrwa

Unit IV +V - L.S.L.Nongbri

Semester - 4

Unit I - H G Laitthma

Unit II - I.Shabong

Unit III + Unit V - D L Jyrwa

Unit IV + Unit V - L.S.L.Nongbri

Semester - 5

H 51

Unit I + Unit II - I.Shabong

Units III,IV,V - D L Jyrwa

H 52

Unit I + Unit II - H G Laitthma

Units III,IV,V - L.S.L.Nongbri

Semester - 6

H 61

Unit I + Unit II - H G Laitthma

Unit III - LS L Nongbri

Unit IV - I.Shabong

Unit V - D L Jyrwa

H 62

Unit I - I.Shabong

Unit II,IV,V - L S L Nongbri

Units III,IV,V - D L Jyrwa

2019 - 2021

Semester-1

Unit I - H G Laitthma

Unit II - I Shabong

Unit III+ Unit V - LSL Nongbri /S Kharbani

Unit IV + Unit V - D L Jyrwa

Semester 2

Unit I - I.Shabong

Unit II + UnitV - L S L Nongbri / S Kharbani

Unit III - H.G.Laitthma

Unit IV + Unit V - D L Jyrwa

Semester - 3

Unit I +Unit V - H G Laitthma

Unit II+Unit V - I Shabong

Unit III - D L Jyrwa

Unit IV - L.S.L.Nongbri /S Kharbani

Semester - 4

Unit I - H G Laitthma

Unit II - I.Shabong

Unit III + Unit V - D L Jyrwa

Unit IV + Unit V - L.S.L.Nongbri / S Kharbani

Semester - 5

H 51

Unit I + Unit II - I.Shabong

Units III,IV,V - D L Jyrwa

H 52

Unit I + Unit II - H G Laitthma

Units III,IV,V - L.S.L.Nongbri / S Kharbani

Semester - 6

H 61

Unit I + Unit II - H G Laitthma

Unit III - LS L Nongbri

Unit IV + V - I.Shabong

Unit V - D L Jyrwa

H 62

Unit I - I.Shabong

Unit II +IV- L S L Nongbri / S Kharbani

Units III +V - D L Jyrwa

2022

Semester 1

Unit I - D L Jyrwa

Unit II - H.G.Laitthma

Unit III +V - I Shabong

Unit IV+V - C Lanong

Semester 2

Unit I +V - I.Shabong

Unit II - C Lanong

Unit III +V - H.G.Laitthma

Unit IV - D L Jyrwa

Semester 3

Unit 1 - I Shabong

Unit II - C Lanong

Unit III + V - H.G.Laitthma

Unit IV+V - D L Jyrwa

Semester - 4

Unit I - I.Shabong

Unit II - H G Laitthma

Unit III +V - C Lanong
Unit IV+ Unit V - D L Jyrwa
Semester 5
H51 - C Lanong
H52 - H.G.Laitthma
H53 - I Shabong
H54 - D L Jyrwa
Semester-6
H61 - I.Shabong
H62 - H G Laitthma
HOP2 &H62 Unit III - D L Jyrwa & C Lanong

Department of Mathematics, Synod College, Shilling.

DEPARTMENT OF PHYSICS

TEACHING METHODS

The Department of Physics makes use of the following teaching methods for the undergraduate classes.

1. <u>Lecture Method</u>: In this method the teacher presents her information on the subject in a comprehensive manner and channelizes the thinking of students in a definite direction. It is teacher directed and maximises students learning time. In this method we also guide students in understanding concepts and also in analytical approach to the subject matter. Students are guided to observe and also use their reasoning to explain various physical phenomena which are based on the fundamentals of physics.

The teaching aids used are blackboard, white board, powerpoint presentation, videos etc.

Learning Outcomes:

- i. To provide knowledge and information on the subject.
- ii. To enable them to develop an understanding of the terms, definitions, concepts and principles taught.
- iii.to create an interest in the subject and motivate them.
- iv. It helps them develop an analytical approach to the subject matter
- 2. <u>Interactive Method</u>: In this method both teacher and student participate in the discussion. The teacher may ask questions on the relevant topics as well as discuss the new information available on the topic or the new insights obtained in the present day. It is a sharing of ideas and this method is also used while solving problems. Students are encouraged to ask questions, analyse a problem, draw conclusions, make inferences on a particular topic of discussion.

Learning Outcomes:

- i. Students can actively engage in the learning process.
- ii. Their understanding of the subject is strengthened and it fosters spirit of enquiry.
- iii. It improves their reasoning skills, deductive logic and problem solving skills.
- 3. <u>Demonstration Method:</u>In this type of teaching the student is able to visualise the illustration of a principle or a concept. Nowadays with the availability of videos and animation students can view the illustration of concepts and principles in three dimensions which greatly help in their understanding. This method stimulates student's interest and curiosity. It also explains to them the practical applications of a concept or a principle.

4. <u>Laboratory Method</u>: This method involves direct students participation or hands on activities which help them participate in scientific investigation. They are able to verify by themselves scientific principles and are involve in data collection and data interpretation. They also learn to work together in groups.

Learning Outcomes:

i.Students develop skills of observation, measurement, classification, inferring, interpreting data and experimenting.

- ii. They acquire skills of manipulating their eye-hand co-ordination while doing the experiments.
- 5. <u>Problem Solving Method</u>: Mathematics and Physics are two subjects which are closely related. There can be no learning of physics without a sound understanding of mathematics. The students are taught the different skills that they need to solve problems, deductive logic, analytical skills as well as being able to interpret the physics behind the equations.

Learning Outcome:

- i. It helps them develop skills in solving problems
- 6. <u>Use of Technology</u>: The department also makes use of various technologies such as OHP, LCD, Smart Class, Ppt presentation and internet.
- 7. Teaching during the Pandemic: Materials for students were sent through different digital platforms such as Google Classroom, what'sapp groups, email and telegram. Videos of the subjects taught were also sent to students through these platforms. Classes were also taken through Google Meet during the pandemic. However due to lack of internet connectivity in many villages students could not access the live class and even if they do it was not clear and audible to them. The students therefore interacted with teacher's mainly through phone calls, whatsapp and expressed their problems while teachers provided reading materials through whatsapp and google classroom.

Some students also engaged themselves by attending various online programmes organised by the science departments of the college like student seminars, online webinars, student exhibition, special lectures especially during the pandemic making use of Google meet.

E-resources such as swayam, inflibnet, digital library and others are also encouraged to be used by students who had good internet connection.

Besides the above remedial classes and mentoring were also done during the offline session for the year 2018 upto early2020 and limited mentoring was done during the pandemic period as many students had gone to their villages and it was difficult as the situation was not very conducive.

Smt. G.A. Kharsyntiew HoD, Physics

DISTRIBUTION OF SYLLABUS 2019 EVEN SEMESTER

SEMESTER – II PHY02(T) ELECTROMAGNETISM, ELECTRONICS - I

UNIT	CONTENT	TEACHER	NO. OF LECTURES	
I	Up to Solenoid	MDW	23	
II	Up to current regulation	GK	15	
I & III	Unit III Complete, Unit I Last paragraph	VGS/GSK	20+7=27	
IV	Up to Barkhausen Criteria	DK	15	
II & IV	Unit II(Faraday's Law), Unit IV(Diodes)	TM	5+5=10	
	PHY02(P)	•		
UNIT	CONTENT	TEACHER		
Practical	Experiment No. 1,2,3,4,7,8,10	VGS/GSK, MDW		
Practical	Experiment No. 1,2,3,4,7,8,10	GK, DK		

SEMESTER – IV PHY04(T) ATOMIC, NUCLEAR & SOLID STATE PHYSICS

E 1 P V D II		
Excluding X-Rays and Laser	VGS/GSK	18
Excluding Particle accelerators, Cosmic Rays	GK	20
Up to Weigner - Seitz cell)	MDW	15
Free Electron theory up to Superconductivity	DK	15
Unit I(X-Rays and Laser), Unit II(Particle	TM	12+10=22
accelerators, Cosmic Rays)	1 1V1	
PHY04(P)	7.35 no.	
CONTENT	TEACHER	
Experiment No. 3,5,6,8,9,11	VGS/GSK, MDW	
Experiment No. 3,5,6,8,9,11	GK, DK	
]	Excluding Particle accelerators, Cosmic Rays Up to Weigner – Seitz cell) Free Electron theory up to Superconductivity Unit I(X-Rays and Laser), Unit II(Particle accelerators, Cosmic Rays) PHY04(P) CONTENT Experiment No. 3,5,6,8,9,11	Excluding Particle accelerators, Cosmic Rays Up to Weigner – Seitz cell) Free Electron theory up to Superconductivity Unit I(X-Rays and Laser), Unit II(Particle accelerators, Cosmic Rays) PHY04(P) CONTENT Experiment No. 3,5,6,8,9,11 VGS

SEMESTER – VI PHY07(T) CONDENSED MATTER PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Excluding Statistics and Probability	VGS/GSK	25
II	Complete	MDW	25
III	Complete	DK	25
IV	Excluding Superconductivity	GK	20

I & IV	Unit I(Statistics and Probability), Unit IV(Superconductivity)	TM	5+5=10
	PHY07(P)		9-
UNIT	CONTENT	TH	EACHER
Practical	Experiment No. 1,2,3,4,5	VGS/GSK	
Practical	Experiment No. 1,2,3,4,5	GK	

PHY08(T) ATOMIC & MOLECULAR SPECTROSCOPY, NUCLEAR PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	25
П	Excluding Fundamental ideas of UV	MDW	20
Ш	Excluding Artificial Radioactivity	GK	25
III	Artificial Radioactivity	DK	15
II & IV	Unit II(Fundamental ideas of UV), Unit IV	TM	5+15=20
	Complete	TM	
e.	PHY08(P)		
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,3,4,5	DK	
Practical	Experiment No. 1,2,3,4,5	MDW	

DISTRIBUTION OF SYLLABUS 2018 ODD SEMESTER

SEMESTER I PHY01(T) MECHANICS, OPTICS & ACOUSTICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I & V	Unit I Complete, Unit V First Half	MDW	45
II &V	Unit II Complete, Unit V Second Half	GK	40
III	Complete	VGS/GSK	25
IV	Entire Unit	DK	40

SEMESTER III PHY03(T) THERMAL PHYSICS & WAVES

UNIT	CONTENT	TEACHER	NO. OF LECTURES	
I	Complete	VGS/GSK	25	
II	Complete	MDW	20	
III	Up to waves in continuous media	GK	20	
III & IV	Unit III(Vibrating Strings & Fourier	DK	10+15=25	
	Analysis) Complete Unit IV			
	PHY03(P)	272 272		
UNIT	CONTENT		TEACHER	
Practical	Experiment No. 1,5,6,8,10	VGS/GSK, DK		
Practical	Experiment No. 2,3,4,7,9		GK, MDW	

SEMESTER – V PHY05(T) MATHEMATICAL & QUANTUM MECHANICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	24
V	Complete	GK	24
II	Complete	MDW	24
III & IV	Complete	DK	33
	PHY	705(P)	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,5	GK	
Practical	Experiment No. 2,3,4	DK	

SEMESTER – V PHY06(T) ELECTRONICS & ELECTRODYNAMICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	22
II	Complete	GK	23
III & IV	Complete	MDW	33
V & VI	Complete	DK	27
	PHY	706(P)	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 3,4,5	VGS/GSK	
Practical	Experiment No. 1,2,6	MDW	

DISTRIBUTION OF SYLLABUS 2019 ODD SEMESTER

SEMESTER I PHY01(T) MECHANICS, OPTICS & ACOUSTICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Unit I Complete	MDW	35
II	Unit II Complete	GK	30
III	Complete	VGS/GSK	25
IV	Up to Plane Grating + Dispersion	DK	30
IV & V	Unit IV(Polarization) + Unit V	TM	30

SEMESTER III

PHY03(T) THERMAL PHYSICS & WAVES

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Transport Phenomena Up to Third law of Thermodynamics	VGS/GSK	15
II	Complete	MDW	20
III	Up to Plane Progressive waves	GK	20
IV	Complete	DK	15
I & III	Unit I(Up to Ruchartds method) + Unit III(Waves in continuous media + Fourier Analysis)	TM	10 + 10 = 20
	PHY03(P)	.the	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,5,6,8,10	VGS/GSK//DK	
Practical	Experiment No. 2,3,4,7,9	GK/MDW	

SEMESTER – V PHY05(T) MATHEMATICAL & QUANTUM MECHANICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Up to curvilinear coordinates + complex variables	VGS/GSK	20
II	Excluding Hermite Polynomials	MDW	20
IV	Complete	DK	24
I, II, III, V	Unit I(Matrices) + Unit II(Hermite Polynomial) + Unit III(Gamma & Beta Functions, Tensors) + Unit V(Schrodinger equation for Hydrogen atom)	TM	4+4+9+4=21
IV	Complete	DK	33
	PHY0	5(P)	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,5	GK	
Practical	Experiment No. 2,3,4	DK	

SEMESTER – V PHY06(T) ELECTRONICS & ELECTRODYNAMICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	22
II	Complete	GK	23
III	Up to Oscillators	MDW	20
V	Complete	DK	20
III & IV	Unit III(Elements of	TM	5+15=20
	Communications)		
54	PHY	706(P)	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 3,4,5	VGS/GSK	
Practical	Experiment No. 1,2,6		MDW

DISTRIBUTION OF SYLLABUS 2019 EVEN SEMESTER

SEMESTER – II PHY02(T) ELECTROMAGNETISM, ELECTRONICS - I

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Up to Solenoid	MDW	23
II	Up to current regulation	GK	15
I & III	Unit III Complete, Unit I Last paragraph	VGS/GSK	20+7=27
IV	Up to Barkhausen Criteria	DK	15
II & IV	Unit II(Faraday's Law), Unit IV(Diodes)	TM	5+5=10
	PHY02(P)	•	
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,3,4,7,8,10	VGS/GSK, MDW	
Practical	Experiment No. 1,2,3,4,7,8,10		GK, DK

SEMESTER – IV PHY04(T) ATOMIC, NUCLEAR & SOLID STATE PHYSICS

E 1 P V D II		
Excluding X-Rays and Laser	VGS/GSK	18
Excluding Particle accelerators, Cosmic Rays	GK	20
Up to Weigner - Seitz cell)	MDW	15
Free Electron theory up to Superconductivity	DK	15
Unit I(X-Rays and Laser), Unit II(Particle	TM	12+10=22
accelerators, Cosmic Rays)	1 1V1	
PHY04(P)	7.35 no.	
CONTENT	TEACHER	
Experiment No. 3,5,6,8,9,11	VGS/GSK, MDW	
Experiment No. 3,5,6,8,9,11	GK, DK	
]	Excluding Particle accelerators, Cosmic Rays Up to Weigner – Seitz cell) Free Electron theory up to Superconductivity Unit I(X-Rays and Laser), Unit II(Particle accelerators, Cosmic Rays) PHY04(P) CONTENT Experiment No. 3,5,6,8,9,11	Excluding Particle accelerators, Cosmic Rays Up to Weigner – Seitz cell) Free Electron theory up to Superconductivity Unit I(X-Rays and Laser), Unit II(Particle accelerators, Cosmic Rays) PHY04(P) CONTENT Experiment No. 3,5,6,8,9,11 VGS

SEMESTER – VI PHY07(T) CONDENSED MATTER PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Excluding Statistics and Probability	VGS/GSK	25
II	Complete	MDW	25
III	Complete	DK	25
IV	Excluding Superconductivity	GK	20

I & IV	Unit I(Statistics and Probability), Unit IV(Superconductivity)	TM	5+5=10
	PHY07(P)		7
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,3,4,5	VGS/GSK	
Practical	Experiment No. 1,2,3,4,5	GK	

PHY08(T) ATOMIC & MOLECULAR SPECTROSCOPY, NUCLEAR PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	25
II	Excluding Fundamental ideas of UV	MDW	20
III	Excluding Artificial Radioactivity	GK	25
III	Artificial Radioactivity	DK	15
II & IV	Unit II(Fundamental ideas of UV), Unit IV	TNA	5+15=20
	Complete	TM	
	PHY08(P)		
UNIT	CONTENT	TEACHER	
Practical	Experiment No. 1,2,3,4,5	DK	
Practical	Experiment No. 1,2,3,4,5	MDW	

DISTRIBUTION OF SYLLABUS 2020 ODD SEMESTER

SEMESTER I PHY01(T) MATHEMATICAL PHYSICS – I, MECHANICS, WAVES AND ACOUSTICS

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I	Mathematical Physics - I	15	
V	Ultrasonics	6	GSK
IV	Waves in Continuous media	5	
II	Mechanics	25	MDW
III	Mechanics	30	GK
IV	Waves(Excluding Waves in Continuous media)	25	DK
V	Acoustics: Intensity & Loudness of Sound, Acoustics of Buildings	14	TM

SEMESTER III PHY03(T) THERMAL PHYSICS, WAVES

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I	Thermal Physics (Excluding 1st Paragraph)	20	GSK
II	Thermal Physics	20	MDW
III	Waves(Excluding Waves in Continuous media, Vibration of strings and Fourier Series)	20	GK
III & IV	Uit III: Vibrating Strings, Unit IV: Quantum Mechanics,	15 + 5 = 20	DGLK
I & III	Unit I: First Paragraph, Unit III: Waves in Continuous media & Fourier Series	5 + 10 = 15	TM
	PHY03(P)		
UNIT	TOPIC	TEACHER	
Practical	Experiment No. 1,2,3,4,7,8,10	GK, GS	K
Practical	Experiment No. 1,2,3,4,7,8,10	MDW, DG	LK

SEMESTER V PHY05(T) MATHEMATICAL PHYSICS, QUANTUM MECHANICS

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I	Complete Unit I Excluding Matrices	20	GSK
II	Complete Unit Excluding Hermite Polynomials	20	MDW
I, II, III, V	Unit I: Matrices, Unit II: Hermite Polynimials Unit III: Complete, Unit IV: Schrodinger Equation of Hydrogen Atom	20	TM
IV	Quantum Mechanics	24	DGLK
V	Quantum Mechanics Excluding Schrodinger Equation of	20	GK

	Hydrogen Atom	
	PHY05(P)	
UNIT	TOPIC	TEACHER
Practical	Experiment No. 1,2,5	GK
Practical	Experiment No. 3, 4	DGLK

SEMESTER V PHY06(T) ELECTRODYNAMICS, ELECTRONICS

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I	Electrodynamics	22	GSK
II	Electromagnetic Potentials	23	GK
III	Electronics (Excluding Elements of Communication)		
III & IV	Unit III: Elements of Communication, Unit IV: Digital Electronics	5 + 15 = 20	TM
V	Fortran	20	DGLK
	PHY06(P)		
UNIT	TOPIC	TEACHER	
Practical	Experiment No. 2,4,6	MDW	7
Practical	Experiment No. 3,5	GSK	

DISTRIBUTION OF SYLLABUS 2020 EVEN SEMESTER

SEMESTER – II PHY02(T) ELECTROMAGNETISM, ELECTRONICS - I

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Up to Solenoid	MDW	23
II	Up to current regulation	GK	15
I & III	Unit III Complete, Unit I Last paragraph	GSK	20+7=27
IV	Up to Barkhausen Criteria	DK	15
II & IV	Unit II(Faraday's Law), Unit IV(Diodes)	TM	5+5=10
	PHY02(P)		•
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,2,3,4,7,8,10	MDW	14
Practical	Experiment No. 1,2,3,4,7,8,10	GK/DK	14

SEMESTER – IV PHY04(T) ATOMIC, NUCLEAR & SOLID STATE PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURE
I	Excluding X-Rays and Laser	GSK	18
II	Excluding Particle accelerators, Cosmic Rays	GK	20
III	Up to Weigner – Seitz cell)	MDW	15
IIII	Free Electron theory up to Superconductivity	DK	15
I, II	Unit I(X-Rays and Laser), Unit II(Particle	TM	12+10=22
	accelerators, Cosmic Rays)	TM	
	PHY04(P)		20
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 3,5,6,8,9,11	GSKMDW	12
Practical	Experiment No. 3,5,6,8,9,11	GK/DK	12

SEMESTER – VI PHY07(T) CONDENSED MATTER PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Excluding Statistics and Probability	VGS/GSK	25
II	Complete	MDW	25
III	Complete	DK	25
IV	Excluding Superconductivity	GK	20
I & IV	Unit I(Statistics and Probability), Unit	TM	5+5=10

	IV(Superconductivity)		
	PHY	707(P)	
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,2,3,4,5	VGS/GSK	10
Practical	Experiment No. 1,2,3,4,5	GK	10

PHY08(T) ATOMIC & MOLECULAR SPECTROSCOPY, NUCLEAR PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Complete	VGS/GSK	25
II	Excluding Fundamental ideas of UV	MDW	20
III	Excluding Artificial Radioactivity	GK	25
III	Artificial Radioactivity	DK	15
II & IV	Unit II(Fundamental ideas of UV), Unit IV Complete	TM	5+15=20
	PHY08(P)	₩ 31	
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,2,3,4,5	DK	10
Practical	Experiment No. 1,2,3,4,5	MDW	10

DISTRIBUTION OF SYLLABUS 2021-22 ODD SEMESTER

SEMESTER I PAPER PHY01(T)

Mathematical Physics-I, Mechanics, Waves and Acoustics

CONTENT	TEACHER	NO. OF LECTURES
Mathematical Physics I, Ultrasonic, Waves in continuous media	GSK	25
Mechanics	MDW	25
Mechanics Excluding Elasticity	GK	20
Waves Excluding Waves in continuous media	DK	25
Elasticity Acoustics- Intensity and Loudness of sound Acoustics of Buildings.	WK	14+10=24
	Mathematical Physics I, Ultrasonic, Waves in continuous media Mechanics Mechanics Excluding Elasticity Waves Excluding Waves in continuous media Elasticity Acoustics- Intensity and Loudness of sound Acoustics of	Mathematical Physics I, Ultrasonic, Waves in continuous media GSK Mechanics MDW Mechanics Excluding Elasticity GK Waves Excluding Waves in continuous media DK Elasticity Acoustics- Intensity and Loudness of sound Acoustics of WK

SEMESTER III PAPER PHY03(T) Thermal Physics, Optics

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Review of Kinetic Theory	MDW	15
II	Liquefaction of gases and Black Body radiation.	73	
Ι	Transport Phenomena and Laws of Thermodynamics	GK	20
III	Optics	GSK	20
IV	Optics (Interference up to Diffraction of light)	DK	20
IV	Polarisation	WK	6+9=15
V	Absorption Bands up to fibre optics		
	PHY03(P)		
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,2,3,4,5,7,9,10	GK, GSK	16
Practical	Experiment No. 1,2,3,4,5,7,9,10	MDW, DGLK	16

SEMESTER V PAPER PHY05(T) Interpretation Physics Operation M

Mathematical Physics, Quantum Mechanics

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Entire Unit Excluding Matrices	GSK	20
II	Entire Unit Excluding Hermite Polynomials	MDW	20
I	Matrices		
II	Hermite Polynomials	WK	20
III	Entire unit		
V	Schrodinger Equation of Hydrogen Atom		
IV	Quantum Mechanics	DGLK	24
V	Quantum Mechanics Excluding Schrodinger Equation of Hydrogen Atom	GK	20

	PHY05(P)		
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,5	GK	6
Practical	Experiment No. 3,4	DGLK	6

SEMESTER V PAPER PHY06(T)

Electrodynamics, Electronics - II

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Electrodynamics	GSK	22
II	Electromagnetic Potentials	GK	23
III	Electronics Excluding Elements of Communications	MDW	20
III	Elements of Communications	WK	5+15=20
IV	Digital Electronics		
V	Fortran	DGLK	20
	PHY06(P)	2 3 0	
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 2,4,6	MDW	6
Practical	Experiment No. 3,5	GSK	6

DISTRIBUTION OF SYLLABUS 2021 EVEN SEMESTER

SEMESTER II PAPER PHY02(T)

Electromagnetism, Electronics - I

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Electric field up to Solenoid.	MDW	23
II	Non-steady currents up to delta and star connections	GK	14
III	Entire Unit Excluding Rectifier	GSK	15
IV	Entire Unit	DK	20
I, II, III	Last paragraph of Unit I, Faraday's Law from Unit II,	WK	7+6+5=18
	Rectifier From Unit III		
	PHY02(P)	901	102
Unit	Content	Teacher	No. of Classes
Practical	Experiment No.1,2,3,4,7,8,9,10	GK, GSK	16
Practical	Experiment No.1,2,3,4,7,8,9,10	MDW, DGLK	16

SEMESTER IV PAPER PHY04(T)

Atomic, Nuclear and Solid State Physics

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Atomic Structure up to 2n ²	GSK	18
II	Entire Unit Excluding Particle Accelerators and Cosmic rays	GK	18
III	Cohesive Energy of Solids up to Wigner-Seitz cell	MDW	15
II, III	Cosmic rays from unit II, Free Electron Theory up to	DK	20
	Superconductivity Unit III	c	
I, II	X rays and Lasers from Unit I, Particle Accelerators,	WK	12+7=19
	Detectors from Unit II		
	PHY04(P)		
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 5,6,7,8,9,11	GK, GSK	12
Practical	Experiment No. 5,6,7,8,9,11	MDW, DGLK	12

SEMESTER VI PAPER PHY07(T) CONDENSED MATTER PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Entire Unit Excluding Statistics and Probability	GSK	25
II	Entire Unit	MDW	25
III	Entire unit	DK	25
IV	Entire Unit Excluding Superconductivity	GK	20
I, IV	Statistics and Probability from unit I, Superconductivity From Unit IV	WK	10

	PHY07(P)	PHY07(P)	7(P)	
Unit	Content	Teacher	No. of Classes	
Practical	Experiment No. 1,2,3,4,5	GSK	10	
Practical	Experiment No. 1,2,3,4,5	GK	10	

PAPER PHY08(T) ATOMIC & MOLECULAR SPECTROSCOPY, NUCLEAR PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Entire Unit	GSK	25
П	Entire Unit Excluding Fundamental ideas of UV etc.	MDW	20
Ш	Artificial Radioactivity	DK	15
Ш	Entire Unit Excluding Artificial Radioactivity	GK	25
I, IV	Fundamental ideas of UV etc. from Unit II, Entire Unit	WK	5+15=20
	IV		STORE AND COLUMN STORE CO.
	PHY08(P)	98 98	50
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 2,5,6	DK	6
Practical	Experiment No. 1,3,4	MDW	6

DISTRIBUTION OF SYLLABUS 2022 ODD SEMESTER

SEMESTER I PHY01(T) MATHEMATICAL PHYSICS – I, MECHANICS, WAVES AND ACOUSTICS

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I	Mathematical Physics - I	15	
V	Ultrasonics	6	GSK
IV	Waves in Continuous media	5	
II	Mechanics	25	MDW
III	Mechanics	30	GK
IV	First three Paragraphs(Excluding Waves in Continuous media)	25	DK
V	Acoustics: Intensity & Loudness of Sound, Acoustics of Buildings	14	WK
III	Elasticity	10	

SEMESTER III

PHY03(T) Thermal Physics, Optics

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Review of Kinetic Theory	MDW	15
II	Liquefaction of gases and Black Body radiation.	MIDW	15
I	Transport Phenomena and Laws of Thermodynamics	GK	20
III	Optics	GSK	20
IV	Optics (Interference up to Diffraction of light)	DK	20
IV	Polarisation	WK	6+9=15
V	Absorption Bands up to fibre optics	WK	0+9-13
	PHY03(P)		
	Experimental Physics-II		
Unit	Content	Teacher	No. of Classes
Practical	Experiment No. 1,2,3,4,5,7,9,10	GK, GSK	16
Practical	Experiment No. 1,2,3,4,5,7,9,10	MDW, DGLK	16

SEMESTER V

PHY05(T- A) MATHEMATICAL PHYSICS - II, QUANTUM MECHANICS - II

UNIT	TOPIC	NO. OF LECTURES	TEACHER
Ι	Curvilinear Coordinates & Complex Variables	20	GSK
II	Entire Unit	25	MDW
I, III	Unit I: Matrices Unit III: Entire Unit	15 + 15 = 30	WK
IV	Entire Unit	20	DGLK
V	Entire Unit	25	GK

$\frac{\text{CLASSICAL MECHANICS, ELECTRODYNAMICS, STATISTICAL PHYSICS, ENERGY SOURCES}{\text{PHY05}(T-B)}$

UNIT	TOPIC	NO. OF LECTURES	TEACHER
I, VI	Unit I: Entire Unit	15 + 12 = 27	DGLK
1, 11	Unit VI: Entire Unit	13 + 12 = 27	DOLK
II	Entire Unit	22	GSK
III	Entire Unit	18	GK
IV	Entire Unit	27	WK
V	Entire Unit	26	MDW

PHY05(P) Experimental Physics-IV

Practical	Experiment No. 2,6,8,9, 10	MDW/DK	10
Practical	Experiment No. 3,4,5,7,11	GSK/WK	10



DISTRIBUTION OF SYLLABUS 2022 <u>EVEN SEMESTER</u>

SEMESTER - II

PHY02(T) ELECTROMAGNETISM, ELECTRONICS - I

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Electric Field Up to Solenoid	MDW	23
II	Non-Steady currents up to delta and star connections	GK	14
III	Entire Unit excluding Rectifier	GSK	15
IV	Entire Unit	DK	20
I, II & III	Unit I: Last paragraph Unit II: Faraday's law Unit III: Rectifier	WK	7 + 6 + 5 = 18
	PHY02(P)		
	Experimental Physics-I		
UNIT	Content	Teacher	No. of Class
Practical	Experiment No.	GK ,MDW,	16
	1,2,3,4,7,8,10	GSK, , DK	10

SEMESTER – IV

PHY04(T)

SPECIAL THEORY OF RELATIVITY, QUANTUM MECHANICS-I, ATOMIC PHYSICS-I, NUCLEAR PHYSICS-I, AND SOLID STATE PHYSICS-I

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I & V	Unit I: Entire Unit Unit V: First paragraph	MDW	10 + 10 = 20
II & V	Unit II: Entire Unit Unit V: Second paragraph		12 + 10 = 22
III	Entire Unit	GSK	18
IV	Unit II: First paragraph and last pragraph	GK	15
IV	Second paragraph onwards excluding Cosmic rays and elementary particles	WK	15
	PHY04(P)		
	Experimental Physics-III		
UNIT	Content	Teacher	No. of Classes
Practical	Experiment No.	GK, DK,	16
	1,2,4,6,7,8,9,10	GSK, MDW	16

SEMESTER - VI

PHY07(T) CONDENSED MATTER PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Entire Unit Excluding Statistics and Probability	GSK	25
II	Entire Unit	MDW	25
III	Entire Unit	DK	25
IV	Entire Unit Excluding Superconductivity	GK	20
I & IV	Unit I(Statistics and Probability), Unit IV(Superconductivity)	WK	5+5=10
	PHY07(P)		
UNIT	Content	Teacher	No. of Classes
Practical	Experiment No.	WK, GSK	15
Practical	1,2,3,4,5	W K, USK	13

PHY08(T) ATOMIC & MOLECULAR SPECTROSCOPY, NUCLEAR PHYSICS

UNIT	CONTENT	TEACHER	NO. OF LECTURES
I	Entire Unit	GSK	25
II	Entire Unit Excluding Fundamental ideas of UV	MDW	20
III	Artificial Radioactivity & Nuclear Fusion	DGLK	15
III	Entire Unit excluding Artificial Radioactivity	GK	25
II & IV	II & IV Unit II(Fundamental ideas of UV), Unit IV Complete		5+15=20
	PHY08(P)		
UNIT	Content	Teacher	No. of Classes
Practical	Experiment No.	DK, MDW	15
Tractical	1,2,4,5		13



2. Distribution of course content

1.1.1. Effective curriculum Delivery (QualitativeMetric)

1. Teaching methods used by the Department for the last 5 years

The department uses the following methods in teaching

- L. Locturing
- 2. Power point presentation
- 3. Animations and images e.g. youtube
- Discussion and interaction
 Department seminar
- 6. Online classes through google meet or Zoom
- 7. Google classroom for class notes and powerpoint presentation
- x. Google forms for students response
- 9. Teaching through you tubes
- 10. Giving articles and class notes through whatsapp groups
- 11. Online seminars/ Exhibition by students
- 12. Giving notes, articles and books

2. Distribution of course content

For the Year 2017-2018

PAPER-IA Systematic, Animal Diversity and Evolution (Theory)

Unit-1: Dr. R. M. Lyngdon (RML)

Unit-2: Dr. R.D. Lyngdob (RDL)

Unit-3: Dr. D. Marnuar (DM)

Unit-4: Dr. A.J.langmi (AJI)

Unit-5: Dr. A. Llangrai & Dr. R.D. Lyngdoh

PAPER-1B Systematic, Animal Diversity and Evolution (Practical)

RML, RDL, DM, AJI

PAPER-2A Cell Biology and Genetics (Theory)

Unit-1; Dr. R. M. Lyngdoh (RML)

Unit-2: Dr. A.J.Jangrai (AH))

Unit-3: Dr. R.D. Lyugdob (RDL

Unit-4: Dr. D. Marngar (DM) Unit-5: Dr. D. Marngar (DM)

PAPER-2B

Cell Biology and Genetics (Practical)

RML RDL, DM, AJI

PAPER-3A

Animal Physiology, Endocrinology and Riochemistry (Theory)

Unit-1: Dr. A.J.Iangrai (AJI) Unit-2: Dr. R.D. Lyogdob (RDL) Unit-3: Dr. R. M. Lyngdob (RML)

Unit-4: Dr. R. M. Lyngdoh (RML) & Dr. R.D. Lyngdoh (RDL

Unit-5: Dr. D. Marngar (DM)

PAPER - 3B

Animal Physiology, Endocrinology and Biochemistry (Practical)

RML, RDL, DM, AJI

PAPER-4A

Developmental Biology, Ecology and Economic Zoology (Theory)

Unit-1: Dr. A.J.Jargrai (AJI) Unit-2: Dr. R. M. Lyngdob (RML)

Unit-3: Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL)

Unit-4: Dr. R. D. Lyngdob (RDL Unit-5: Dr. D. Marngar (DM)

PAPER - 48

Developmental Biology, Ecology and Economic Zoology (Practical)

RML, RDL, DM, AJI

PAPER-5A

Functional Anatomy, Zoogeography and Adaptations (Theory)

Unit-1; Dr. R.D. Lyngdon (RDL) Unit-2; Dr. D. Marrigar (DM)

Unit-3: Dr. R. M. Lyngdob (RML)

Unit-4: Dr. A.J.langsai (All)

Unit-5: Dr. R. M. Lyngdob (RML) & Dr. A.Llangrai (AJI) PAPER - SB

Functional Anatomy, Zoogeography and Adaptations (Practical)

RML, RDL, DM, AJI

PAPER - 6A Cell and Molecular Biology and Genetics (Theory)

Unit-1: Dr. D. Marngar (DM) Unit-2: Dr. D. Marngar (DM) & Dr. R.D. Lyngdob (RDL)

Unit-3: Dr. R. M. Lyngdoh (RML)

Unit-4: Dr. A.J.langrai (AJI)

Unit-5: Dr. R.D. Lyngdoh (RDL)

PAPER - 6B Cell and Molecular Biology and Genetics (Practical)

RML, RDL, DM, AJI

PAPER - 7A Biochemistry, Animal Physiology and Endocrinology (Theory)

Unit-1: Dr. D. Maragar (DM)

Unit-2: Dr. R. M. Lyngdoh (RML)

Unit-3: Dr. R.D. Lyngdoh (RDL)

Unit-4: Dr. A.J.Iangrai (AJI) & Dr. R.D. Lyapdoh (RDL)

Unit-5: Dr. A.J.Iarugrai (AJI)

PAPER-7B

Biochemistry, Animal Physiology and Endocrinology (Practical)

RDL_DM

PAPER-8A

Developmental Biology, Environmental Biology and Biotechnology (Theory)

Unit-1: Dr. A.J.Iangrai (AJI)

Unit-2: Dr. A.J.Iangrai (AJI)

Unit-3; Dr. R. M. Lyngdoh (RML) Unit-4; Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL) Unit-5; Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL)

PAPER - 8B

Developmental Biology, Environmental Biology and Biotechnology (Practical)

RML, AJI:

2. Distribution of course content

2018-2019

For the Year 2018-2019

PAPER-1A Systematic, Animal Diversity and Evolution (Theory)

Unit-1: Dr. R. M. Lyngdob (RML)

Unit-2: Dr. R.D. Lyngdoh (RDL)

Unit-3: Dr. D. Marngar (DM)

Unit-4: Dr. A.J.langrai (AJI)

Unit-5: Dr. A.J.langrai & Dr. R.D. Lyngdob

PAPER-1B Systematic, Animal Diversity and Evolution (Practical)

RML_RDL_DM, AJI.

PAPER-2A Cell Biology and Genetics (Theory)

Unit-1: Dr. R. M. Lyngdeh (RML)

Unit-2: Dr. A.J.langrai (AJI))

Unit-3: Dr. R.D. Lyngdoh (RDL

Unit-4: Dr. D. Maragar (DM)

Unit-5: Dr. D. Maragar (DM)

PAPER-2B Cell Biology and Genetics (Practical)

RML, RDL, DM, AJI

PAPER - 3A Animal Physiology, Endocrinology and Biochemistry (Theory)

Unit-1: Dr. A.J.langrai (AJI)

Unit-2: Dr. R.D. Lyngdoh (RDL.

Unit-3: Dr. R. M. Lyngdob (RML)

Unit-4: Dr. R. M. Lyngdob (RML) & Dr. R.D. Lyngdob (RDL Unit-5: Dr. D. Marugar (DM)

PAPER-3B

Animal Physiology, Endocrinology and Biochemistry (Practical)

RML, RDL, DM, AJI

PAPER - 4A Developmental Biology, Ecology and Economic Zoology (Theory)

Unit-1: Dr. A.J. langrai (AJI)

Unit-2: Dr. R. M. Lyngdoh (RML)

Unit-3: Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL)

Unit-4: Dr. R. D. Lyngdoh (RDL Unit-5: Dr. D. Mamgar (DM)

PAPER-4B

Developmental Biology, Ecology and Economic Zoology (Practical)

RML, RDL, DM, AJI

PAPER-5A

Functional Anatomy, Zoogeography and Adaptations (Theory)

Unit-1: Dr. R.D. Lyngdoh (RDL)

Unit-2: Dr. D. Marnuar (DM)

Unit-3: Dr. R. M. Lyngdoh (RML)

Unit-4; Dr. A.J.Inngrai (AJI)

Unit-5: Dr. R. M. Lyngdoh (RML) & Dr. A.J.Inngrai (AJI)

PAPER-5B

Functional Anatomy, Zoogcography and Adaptations (Practical)

RML, RDL, DM, AJI

PAPER-6A

Cell and Molecular Biology and Genetics (Theory)

Unit-1: Dr. D. Marngar (DM)

Lint-2: Dr. D. Maengar (DM) & Dr. R.D. Lyngdoh (RDL)

Unit-3: Dr. R. M. Lyngdoh (RML)

linit-4: Dr. A.J.langrai (AJI)

Unit-5: Dr. R.D. Lyngdob (RDL)

PAPER-6B

Cell and Molecular Biology and Genetics (Practical)

RML, RDL, DM, AJI

Topic of Applican

PAPER-7A Biochemistry, Animal Physiology and Endocrinology (Theory)

Unit-1: Dr. D. Marngar (DM)

Unit-2: Dr. R. M. Lyngdob (RML)

Unit-3: Dr. R.D. Lyngdob (RDL)

Unit-4: Dr. A.J.langrai (AJI) & Dr. R.D. Lyngdoh (RDf.)

Unit-5: Dr. A.J.langrai (AJI)

PAPER-7B

Riochemistry, Animal Physiology and Endocrinology (Practical)

RDL DM

PAPER-8A

Bevelopmental Biology, Environmental Biology and Biotechnology (Theory)

Unit-1: Dr. A.J.Jangmi (AJI)

Unt-2: Dr. A.J. Langras (A21)

Unit-3: Dr. R. M. Lyngdoh (RML)
Unit-4: Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL)
Unit-5: Dr. D. Marngar (DM) & Dr. R.D. Lyngdoh (RDL)

PAPER-SB

Developmental Biology, Environmental Biology and Biotechnology (Practical)

RME, AZI

2. Distribution of course content

2019-2020

PAPER - 1A Systematic, Animal Diversity and Evolution (Theory) Unit-1: Mins. I. Dichar (ID) Unit-2: Dr. R.D. Lyngdoh (RDL) Unit-3: Dr. D. Marngar (DM) Unit-4: Dr. A.J Jangrai (All) Unit-3: Dr. A.J Jangrai & Dr.M. Kharbangar (MK)

PAPER - 1B Systematic, Animal Diversity and Evolution (Practical)

Dr. R.D. Lyngdob (RDL) Dr. D. Marngar (DM) Dr. A.J.Iangrai (AJI) Miss. I. Dkhar (ID) Dr. M. Kharbangar (MK)

PAPER - 2A Cell Biology and Genetics (Theory)

Unit-1: Dr. M. Khartsugar (MK) & Dr. R.D. Lyngdob (RDL) Unit-2: Dr. A.J.fangrai (All) Unit-3: Dr. R.D. Lyngdob (RDL) Unit-4: Dr. D. Marngar (DM) Unit-5: Miss I. Okhar

PAPER – 2B Cell Biology and Genetics (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marrgar (DM) Dr. A.J. Langrai (AJL) Miss. L. Dichar (ED)

PAPER - 3A Animal Physiology, Endocrinology and Biochemistry (Theory)

Unit-1: Dr. A.J. Langrai (AJI) Unit-2: Dr. M.D. Lyngdob (RDL) Unit-3: Miss I. Dkhar (ID)

Unit-4: Dr.M. Kharbangar (MK) & Miss I. Dkhar (ID)

Unit-5: Dr. D. Marngor (DM)

Department of Zealogs. Symat Carlogs, Stationer

PAPER - 3B Animal Physiology, Endocrinology and Biochemistry (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Murngar (DM) Dr. A.J.langrai (AJI) Miss. L. Dkhar (ID)

PAPER – 4A Developmental Biology, Ecology and Economic Zoology (Theory)

Unit-1: Dr. A.J.Iangrai (AJI) Unit-2: Miss. I. Dkhar (ID)

Unit-3: Dr. D. Marngar (DM) & Dr. M. Kharbangar (MK)

Unit-4: Dr. R. D. Lyngdoh (RDL) Unit-5: Dr. D. Marngar (DM)

PAPER - 4B Developmental Biology, Ecology and Economic Zoology (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.Hangrai (AR) Miss. I. Dkhar (ID)

PAPER - 5A Functional Anatomy, Zoogeography and Adaptations (Theory)

Unit-1: Dr. R.D. Lyngdoh (RDL) Unit-2: Dr. D. Marngar (DM) Unit-3 Dr. A.J. langrai (AJI) & Miss I. Dkhar (ID) Unit-4: Dr. A.J. langrai (AJI) Unit-5: Dr. M. Kharbangar (MK) & Miss I. Dkhar (ID)

PAPER - 5B Functional Anatomy, Zoogcography and Adaptations (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Maengar (DM) Dr. A.J. Langrai (AJI) Miss. 1. Dichar (ID)

Corporation of Section

PAPER-6A Cell and Molecular Biology and Genetics (Theory)

Unit-1: Dr. D. Marngar (DM) Unit-2: Miss. I. Dkhar (ID)

Unit-3: Dr. R.D. Lyngdoh (RDL), Dr. A.J.Iangrai (AJI) & Dr. M. Kharbangar (MK)

Unit-4: Dr. A.J.langrai (AJI) Unit-5: Dr. R.D. Lyngdoh (RDL)

PAPER-6B Cell and Molecular Biology and Genetics (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.J.Imprai (AJI) Miss. L. Dkhar (ID).

PAPER-7A Biochemistry, Animal Physiology and Endocrinology (Theory)

Unit-1: Dr. D. Marngar (DM) Unit-2: Miss. I. Dkhar (ID)

Unit-3: Dr. R.D. Lyngdoh (RDL), Dr. D. Marngar (DM) & Dr. M. Kharbungar (MK)

Unit-4: Dr. R.D. Lyngdoh (RDL) Unit-5: Dr. A.J Jangrai (AJI)

PAPER-7B Biochemistry, Animal Physiology and Endocrinology (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Miss I. Dkhar (ID)

PAPER -8A

Developmental Biology, Environmental Biology and Biotechnology (Theory)

Unit-1: Dr. A.J.Inngrai (AJI)

Unit-2: Dr. A.J.langsai (All) & Dr. D. Marngar (DM) Unit-3: Miss. L. Dkhar (ID) & Dr. M. Kharbungar (MK) Unit-4: Miss. 1. Dkhur (ID) & Dr. D. Marngar (DM) Unit-5; Dr. D. Martigar (DM) & Dr. R.D. Lyngdob (RDL)

PAPER-8B

Developmental Biology, Environmental Biology and Biotechnology (Practical) Dr. A.J. Jangmi (A.H)

Miss. I. Dkhar (ID)

2. Distribution of course content

2020-2021

For the Year 2020-2021

PAPER - 1A Systematic, Animal Diversity and Evolution (Theory)

Unit-1: Miss. I. Dkhar (ID)

Unit-2: Dr. R.D. Lyngdoh (RDL)

Unit-3: Dr. D. Marngar (DM)

Unit-4: Dr. A.I. langrai (AJI)

Unit-5; Dr. A.J. langrai & Dr.M. Kharbungar (MK)

PAPER-IB

Systematic, Animal Diversity and Evolution (Practical)

Dr. R.D. Lyngdoh (RDL)

Dr. D. Marogor (DM)

Dr. A.J.Jangroi (AJI)

Miss. I. Dkhar (ID)

Dr.M. Kharbangar (MK)

PAPER-2A

Cell Biology and Genetics (Theory)

Unit-1: Dr. M. Kharbangar (MK) & Dr. R.D. Lyngdoh (RDL)

Unit-2: Dr. A.J. langral (AJI)

Unit-3: Dr. R.D. Lyngdob (RDL)

Lint-4: Dr. D. Marngar (DM)

Unit-5: Miss I, Dkhur

PAPER - 2B

Cell Biology and Genetics (Practical)

Dr. R.D. Lyngdoh (RDL)

Dr. D. Marngar (DM)

Dr. A.J.langrai (AJI)

Miss. L. Dkhar (ID)

PAPER-3A

Animal Physiology, Endocrinology and Biochemistry (Theory)

Unst-1: Dr. A. Llangrai (AJI)

Unit-7: Dr. R.D. Lyngdob (RDL)

Unit-3: Miss I. Dkhar (ID)

Unit-4: Dr.M. Kharburgar (MK) & Miss I, Dkhar (ID) Unit-5: Dr. D. Marngar (DM)

Department of Tomingy, Symbol Goldage

PAPER-3B Animal Physiology, Endocrinology and Biochemistry (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.J.Imgrai (AJI) Miss. L. Dkhur (ID)

PAPER-4A Developmental Biology, Ecology and Economic Zoology (Theory)

Unit-1: Dr. A.J.langrai (AJI)

Unit-2: Miss. I. Dkhar (ID) Unit-3: Dr. D. Marrigar (DM) & Dr. M. Kharbangar (MK)

Unit-4: Dr. R. D. Lyngdoh (RDL) Unit-5: Dr. D. Marnger (DM)

PAPER-4B Developmental Biology, Ecology and Economic Zoology (Practical)

Dr. R.D. Lyngdob (RDL) Dr. D. Marngar (DM) Dr. A.J.Jangrai (AJI) Mins. I. Dichar (ID)

PAPER - 5A Functional Anatomy, Zoogeography and Adaptations (Theory)

Unit-1: Dr. R.D. Lyngdoh (RDL) Unit-3: Dr. D. Marngar (DM)

Unit-3 Dr. A.J. Jangrai (AJI) & Miss L. Dkhur (ID)

Linit-4: Dr. A.J. langrai (AJI)

Unit-5: Dr. M. Kharbungar (MK) & Miss I, Dkhar (H)

PAPER-5B Functional Anatomy, Zoogrography and Adaptations (Practical)

Dr. R.D. Lyngdob (RDL) Dr. D. Marngar (DM) Dr. A.J. Langrai (AJI) Miss. I. Dkissr (ID)

PAPER - 6A Cell and Molecular Biology and Genetics (Theory)

Umi-1: Dr. D. Maragar (DM)

Unit-2: Miss. L Dkhar (ID)

Unit-): Dr. R.D. Lyngdoh (ROL), Dr. A.J.langrai (All) & Dr. M. Kharbargar (MK)

Unit-4: Dr. A.J. langrai (AJI)

Unit-5: Dr. R.D. Lyngdoh (RDL)

PAPER – 6B Cell and Molecular Biology and Genetics (Practical)

Dr. R.D. Lyngdoh (RDL)

Dr. D. Marngur (DM)

Dr. A.J.Jangsai (AJJ)

Miss. I. Dkhur (ID)

PAPER-7A

Biochemistry, Animal Physiology and Endocrinology (Theory)

Unit-1; Dr. D. Marrigur (DM)

Unit-2: Miss. I. Dichar (ID)

Unit-3: Dr. R.D. Lyngdoh (RDL), Dr. D. Marngar (DM) & Dr. M. Kharbangar (MK)

Unit-4: Dr. R.D. Lyngdoh (RDL)

Unit-5: Dr. A.J. langrai (AJI)

PAPER - 7B

Biochemistry, Animal Physiology and Endocrinology (Practical)

Dr. R.D. Lyngdoh (RDL)

Dr. D. Marngar (DM)

Miss. I. Dkhur (ID)

PAPER-SA

Developmental Biology, Environmental Biology and Biotechnology (Theory)

Unit-1: Dr. A.J.Janurai (AJI)

Unit-2: Dr. A.J.langrai (AJI) & Dr. D. Marngar (DM)

Unit-3: Miss. I. Dkhur (ID) & Dr. M. Kharbangar (MK)

Unit-4: Miss. J. Dkhar (ID) & Dr. D. Marngar (DM)

Unit-5: Dr. D. Marrigar (DM) & Dr. R.D. Lyngdob (RDL)

PAPER - 8B

Developmental Biology, Environmental Biology and Biotechnology (Practical)

Dr. A.J,langrai (AJI)

Min. L. Dichar (tD)

Department of Zoolog

2. Distribution of course content

2021-2022

For the Year 2021-2022 PAPER-IA Systematic, Animal Diversity and Evolution (Theory) Unit-1: Miss. 1. Dichar (TD) Unit-2: Dr. R.D. Lyngdob (RDL) Unit-3: Dr. D. Marngar (DM) Unit-4: Dr. A.J. langrai (AJI) Unit-5: Dr. A.J. langrai & Dr.M. Kharbangar (MK) PAPER-1B Systematic, Animal Diversity and Evolution (Practical) Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.J. Jangrai (AJI) Miss. I. Dkhar (1D) Dr.M. Kharbungar (MK) PAPER-2A Cell Biology and Genetics (Theory) Unit-1: Dr. M. Kharbungar (MK) & Dr. R.D. Lyngdoh (RDL) Unit-2: Dr. A.J.Iangrai (AJI) Unit-3: Dr. R.D. Lyngdoh (RDL) Unix-4: Dr. D. Marrigur (DM) Unic-5: Miss L Dkhar PAPER-2B Cell Biology and Genetics (Practical) Dr. R.D. Lyngdob (RDL) Dr. D. Marrigar (DM) Dr. A.J.Jangrai (AJI) Miss. L. Dkhar (ID) PAPER-3A Animal Physiology, Endocrinology and Biochemistry (Theory) Unit-1: Dr. A.J.langrai (AJI) Unit-2: Dr. R.D. Lyngdob (RDL) Unit-3; Mint L Dkhar (ID) Unit-4: Dr.M. Kharbungar (MK) & Miss I, Dkhar (ID) Unit-5: Dr. D. Marnuar (DM)

PAPER-3B Animal Physiology, Endocrinology and Biochemistry (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.J.langrai (AJI) Miss. 1. Dkhar (ID)

PAPER - 4A Developmental Biology, Ecology and Economic Zoology (Theory)

Unit-1: Dr. A.J. langmi (AJI) Unit-2: Miss. I. Dkhar (ID)

Unit-3: Dr. D. Marngar (DM) & Dr. M. Kharbongar (MK)

Unit-4: Dr. R. D. Lyngdob (RDL) Umit-5: Dr. D. Marngur (DM)

PAPER - 4B Developmental Biology, Ecology and Economic Zoology (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngur (DM) Dr. A.J. langrai (AJI) Miss. 1. Dkhar (ID)

PAPER - 5A Functional Anatomy, Zoogeography and Adaptations (Theory)

Unit-1: Dr. R.D. Lyngdoh (RDL) Unit-2: Dr. D. Marngar (DM)

Unit-3 Dr. A.J.Jangrai (AJI) & Miss I. Dkhar (ID)

Unit-4: Dr. A.J.Jangrai (AJI)

Unit-5: Dr. M. Kharhangar (MK) & Miss I. Dkhar (ID)

PAPER-5B Functional Anatomy, Zoogeography and Adaptations (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marrigur (DM) Dr. A.J. Lungrai (AJI) Mim. I. Dkhar (ID)

PAPER-6A Cell and Molecular Biology and Genetics (Theory)

Unit-1: Dr. D. Marngar (DM)

Unit-2: Miss. L. Dkhar (ID) Unit-3: Dr. R.D. Lyngdoh (RDL), Dr. A.J.langrai (AJI) & Dr. M. Kharbangar (MK)

Unit-4: Dr. A.J.langrai (All) Unit-5: Dr. R.D. Lyngdoh (RDL)

PAPER-6B Cell and Molecular Biology and Genetics (Practical)

Dr. R.D. Lyngdoh (RDL) Dr. D. Marngar (DM) Dr. A.I. Jungrai (AJI) Miss. L. Dkhar (ID)

PAPER-7A Biochemistry, Animal Physiology and Endocrinology (Theory)

Unit-1: Dr. D. Marngar (DM) Unit-2: Miss. I. Dkbar (ID)

Unit-3: Dr. R.D. Lyngdoh (RDL), Dr. D. Marngar (DM) & Dr. M. Kharbangur (MK)

Unit-4: Dr. R.D. Lynedoh (RDL) Unit-5: Dr. A.J. Jangrai (AJI)

PAPER-7B Biochemistry, Animal Physiology and Endocrinology (Practical)

Dr. R.D. Lyngdob (RDL) Dr. D. Marngur (DM) Miss. I. Dkhar (ID)

PAPER - 8A

Developmental Biology, Environmental Biology and Biotechnology (Theory)

Unit-1: Dr. A.J.langrai (AJI)

Una-2: Dr. A.J.lungrai (AJI) & Dr. D. Maragar (DM) Unit-3: Miss. I. Dkhar (ID) & Dr. M. Kharbangar (MK) Unt-4: Miss. I. Dkbar (ID) & Dr. D. Marugar (DM) Unit-5: Dr. D. Marnuar (DM) & Dr. R.D. Lyngdoh (RDL)

PAPER - 8B

Developmental Biology, Environmental Biology and Biotechnology (Practical)

Dr. A.J.Imgrai (AJI) Miss. L. Dkhur (ID)

DEPARTMENT OF COMPUTER SCIENCE

List of teaching methods adopted by the department:

1. Lecture method

Definition: Lecture Method is a process of teaching whereby the teacher tells the students his planned facts. The students listen and take notes. It is one of the oldest methods in use. The success of this method depends on the ability of the teacher to speak fluently in good tone and style.

Objectives:

- To deliver new subject knowledge to the students
- To developed the habit of concentration and focus among the students
- To developed the subject interest by the students
- To help students attain better perception on the subject

When to use it:

- Introducing a new topic
- To stimulate the student's interest
- Clarification on misunderstood points

Implementation:

- An instructor should make an adequate preparation prior to the class which can be as follows:
- An interesting introduction about the topic
- Preparation of the materials or lecture with supporting aids (eg. Slides presentation)

References:

https://thenewtimespress.com/archives/5164

2. Interactive method

Definition: A two-way method in which both the instructor and students are actively involves in the learning process.

Objectives:

- To motivates and expects students/learners to participate actively
- Involving Teachers as well as students

When to use it:

Any time

Implementation:

- Think, pair, and share Establish a problem or a question, and then pair your students. Give each pair sufficient time to form a conclusion, and permit each participant to define the conclusion in his or her personal voice. You can also request that one student explain a concept while the other student evaluates what is being learned. Apply different variations of the process—your students will be engaged, communicating, and retaining more information before your eyes.
- **Q&A sessions** On the heels of every topic introduction, but prior to formal lecturing, ask your students to jot down questions pertaining to the subject matter on 3×5 index cards. After you collect the cards, mix them up and read and answer the student-generated questions.

- Why Do You Think That? Follow up all student responses (not just the incorrect ones) with a challenge to explain their thinking, which trains students over time to think in disciplineappropriate ways.
- Think Break Ask a rhetorical question, and then allow 20 seconds for students to think about the problem before you go on to explain. This technique encourages students to take part in the problem-solving process even when discussion isn't feasible. Having students write something down (while you write an answer also) helps assure that they will in fact work on the problem.
- Make Them Guess Introduce a new subject by asking an intriguing question, something that few will know the answer to (but should interest all of them). Accept blind guessing for a while before giving the answer to build curiosity.

References:

https://education.cu-portland.edu/blog/classroom-resources/5-interactive-teaching-styles-2/

3. Seminars

Definition: A seminar is a class at a <u>college</u> or university in which the <u>teacher</u> and a small group of students discuss a topic.

Objectives:

- To improve students communication skills
- To help students experience public speaking
- To group students in working together
- To bring out the creativeness of a student or students.

When to use it:

- Required to motivate the students in facing the public
- When students has prior knowledge to the topic of the subject

Implementation:

- Determine the topic or topics for the seminar.
- Give the students sample presentation structure
- Give Students Time to prepare (materials, presentation)

References:

https://www.collinsdictionary.com/dictionary/english/seminar

4. Video tutorials

Definition: Video tutorials, whether recorded or live, are important to students because they add another dimension to learning that makes a student's educational experience more effective. The videos allow a classroom setting to come to life, offering different perspectives and tools that students might not normally be able to take advantage of in their learning

Objectives:

- To attract and retain learners' attention
- To generate interest across different levels of students
- To make class more interesting

When to use it:

- Required when student's attentiveness decreases
- When students want repetitive explanation or additional explanation

Implementation:

- Gather video tutorials on various topics of a particular subject
- Scrutinize the tutorials
- Post them on the platform for students to access.

References

- https://work.chron.com/importance-video-tutorials-students-16633.html
- https://en.wikipedia.org/wiki/Audiovisual education

5. Social media

Definition: Social media is the collective of online communications channels dedicated to community-based input, interaction, content-sharing and collaboration.

Objectives

- To help students connect with the instructor for topic queries of a particular subject
- To help students share and discuss among themselves

When to use it:

Anytime but not during class hours

Implementation:

- Create a group in any social media platform (eg. WhatsApp)
- Organize learning resources
- Supplement course materials

References:

- https://whatis.techtarget.com/definition/social-media
- https://www.mheducation.com/blog/thought-leadership/how-social-media-can-help-studentsstudy.html
- Students during off days or holidays are connected via Whatsapp to provide them additional information.

P. Joshi (Asst. Professor)

Distribution of Course Content (last five years)

1st Semester:

Mathematics Paper 1

- 1. Unit 1: Allando Raplang
- 2. Unit 2 & 3: Darina L. Mawphlang
- 3. Unit 4 & 5: Wanbhalin Khongthaw

Problem Solving and Programming in C

1. All 5 units both theory and practical taken by Pankaj Joshi

Digital Computer Fundamentals

1. All 5 units taken by Wanbhalin Khongthaw

2nd Semester:

Mathematics Paper 2:

- 1. Unit 1 & 2(theory): Darina L. Mawphlang
- 2. Unit 3, 4 & 5(theory and practical): Allando Raplang

Data Structure

1. All 5 units both theory and practical taken by Pankaj Joshi

Computer System Architecture

1. All 5 units taken by Wanbhalin Khongthaw

3rd Semester:

Operating System and Introduction to Linux

1. All 5 units both theory and practical taken by Allando Raplang

Financial Accounting

1. Taken by the Commerce Department

Database Management System

1. All 5 units both theory and practical taken by Darina L. Mawphlang

4th Semester:

Data Communication and Networking

1. All 5 units taken by Allando Raplang

Visual Basic.Net

1. All 5 units both theory and practical taken by Darina L. Mawphlang

Software Engineering

1. All 5 units taken by Pankaj Joshi

5th Semester:

Internet and Web Technology using MySQL with PHP

1. All 5 units both theory and practical taken by Allando Raplang

Object Oriented Programming with JAVA

1. All 5 units both theory and practical taken by Wanbhalin Khongthaw

Compulsory English

1. Taken by the English Department

6th Semester:

Network Security

1. All 5 units taken by Wanbhalin Khongthaw

Environmental Studies

1. Taken by the Environmental Studies Department

Project

1. Taken by all teachers of the Computer Science Department in which each teacher are assigned as guides for a particular group of students.



Department of Commerce Synod College, Shillong

Alternative English	English Department
Financial Management	Mr. Alwin Kupar Lyngdoh
Auditing	Mrs. A. S. Dympep
Human Resource Management	Mrs. A. Shylla and Mr. Alwin Kupar Lyngdoh
5 th Semester	Teacher
Compulsory-English	Englisk Department
Cost Accounting	Mr. Alwin Kupur Lyngdolt
Financial Service	Mr. Alwin Kupur Lyngdob
Service Management	Mrs. A. Shylla and Mrs. A. S. Dympep
6 th Semester	Teacher
Environmental Studies	Environmental Studies Department
Entrepressurship Development	Mr. Alwin Kupar Lyngdoh, Mrs. A. Shylla and Mrs. A. S Dympep
Direct Tax Law and Practice	Mr. Alwin Kupur Lyngdoh
Small Enterprise Management	Mrs. A. Shylla and Mrs. A. S. Dympep

Thanking you.

Yours faithfully,

Alwin Kupar Lyngdoh

Department of Commerce

.08. 202 P

Synod College

Shillong.

Head, Department of Commerce, Synod College, Shillong,

Department of Commerce Synod College, Shillong

Department of Commerce Synod College

Teaching Methods:

- · Chalk-Board Method
- Students Seminar
- · Individual and Group Assignments
- Group Discussions.
- · Worksheets and Practice sheets for quantitative papers
- · Remedial Classes
- Online Classes

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Alwin Kupar Lyngdoh

Head

Department of Commerce

Synod College

Shillong

Organization of Commerce. Byond College, Station

Teaching Methods

- 1. Lecture cum Discussions
- 2. Debates
- 3. Videos and documentaries

Distribution of Course Content

First Semester

1.	POL-C.101:	Liberal Political Theory	(Dr Mrs J Hek)
2.	POL-C.102:	Theory of International Politics	(Mrs E Thangkhiew)
3.	POL-C.103:	Major Concepts and Issues in Public Administration	(Dr CR Lyngdoh)
4.	POL-C.104:	Indian Political System	(Miss BN Nonglait)
5.	POL-C.105:	State Politics in India with Spl.Ref. to N.E.India (I)	(Professor LS Gassah)

Second Semester

1.	POL-C.201:	Marxist Political Theory	(Dr Mrs J Hek)
2.	POL-C.202:	Problems of International Politics	(Mrs E Thangkhiew)
3.	POL-C.203:	State Politics in India with Spl.Ref. to N.E.India (II)	(Professor LS Gassah)
4.	POL-C.205:	Administrative Theory	(Dr CR Lyngdoh)
5.	POL-C.206:	East & South East Asian Political Systems	(Miss BN Nonglait)

Third Semester

		Contemporary Political Theory Research Methodology (I)	(Dr Mrs J Hek) (Professor LS Gassah)
3.	POL-C.304:	International Law & International Organisation	(Dr CR Lyngdoh)
4.	POL-C.305:	South Asian Political Systems	(Mrs E Thangkhiew)
5.	POL-O.311:	Issues in Environmental Studies	(Miss BN Nonglait)

Fourth Semester

2.	POL-C.402:	Major Debates in Political Theory Comparative Politics Research Methodology (II)	(Dr Mrs J Hek) (Mrs E Thangkhiew) (Professor LS Gassah)
4.	POL-C.407:	Indian Political Economy	(Miss BN Nonglait)
5.	POL-C.408:	Human Rights	(Dr CR Lyngdoh)

Signature of Head

Description of the teaching methods used by the departments

The Department uses various ICT techniques (online and offline)

Online – Google classroom –

synodeollegepgeducationnet21(a/gmail.com

synodeollegepgeducation2021@gmail.com

synodcollegepgeducationexam21@gmail.com

synodcollegepgeducation2019@gmail.com

synodcollegepgeducation2021@gmail.com

Blogger

https://scpgedblogaddress.blogspot.com

LMS

https://synodcollegepgeducation2021.gnomio.com

Admission

https://www.synodadmission.in/admin

Nehu erp

http://erp.nehu.ac.in/

Online Storage of data and materials

https://app.degoo.com/moments

login - synodcollegepgeducation2021@gmail.com

Teaching platform and Interaction

Zoom

Google meet

Jitsi

WhatsApp

The department as well uses Discussion method, Seminar method, Lecture method and Practical's (in conducting experiments and test).

The department uses Heuristic approach as in the form of Assignment for each semester.

The department conducts three (3) regular formative evaluation test for each semester.

The students are also well oriented into the research method as each student has to make a research proposal.

4)The department also organizes language and communication skills training. Students maintain a writing portfolio to document all the activities and exercises that they have learnt during the training.

Study tours and various extension services are also organised to enhance the knowledge and skills of the students.

The department has also been organising coaching classes for students for NET.

The department has also been organising yoga classes.

The department has been organising a Certificate course for Statistics.

The department has also been organising communication classes.

The department has also plans for organising an Employability skills course for students.

The department has also plans for organising Coaching classes for MTET.

The department has also plans for organising Coaching classes for various Competitive Examination.

Dr. E. B. Majaw

Department of Education (PG)

Course distributions

Distribution of the Course content amongst the teachers of the departments in the last three years

1st Semester

Courses	Core/Open	Credit s	Contact hours	Mark s	TEACHERS (In-charge)	TEACHERS (In-charge of Assignment)	Test 1 Test 2 Test 3
EDN (C) 101: Philosophical Foundation of Education	Core	4	48	100	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem		Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem
EDN (C) 102: Advanced Educational Psychology	Core	4	48	100	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem		Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem
EDN (C) 103: Educational Management and Change	Core	4	48	100	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem	Dr R Lapasam	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsymiew Mrs S Syiem
EDN (C) 104: Research Methodology in Education I	Core	4	48	100	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem	Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem
EDN (C) 105: Research Methodology in Education II	Core	2	24	50	Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Palisynticw Mrs S Syien		Dr E B Majaw Dr R Lapasam Dr B Sumer Dr A Pahsyntiew Mrs S Syiem
Total		18	216	450			

2nd Semester

Courses	Core/Open	Credit	Contac t hours	Mark s	Teachers	TEACHERS (In-charge of Assignment)	Test 1 Test 2 Test 3
EDN (C) 201: Curriculum Development & Instruction	Core	4	48	100	Dr E Majaw Dr B Sumer	Dr E Majaw	Dr E Majaw Dr B Sumer
EDN (C) 202: Sociology of Education	Core	4	48	100	Dr R Lapasam Dr A Pahsyntie W	Dr R Lapasam	Dr R Lapasam Dr A Pahsyntie W
EDN (C) 203: Educational Testing & Evaluation	Core	4	48	100	Dr B Sumer Dr R Lapasam	Dr B Sumer	Dr B Sumer Dr R Lapasam
EDN (O) 204: Environmental Education	Open	4	48	100	Dr E Majaw Dr A Pahsyntie w	Dr A Pahsyntiew	Dr E Majaw Dr A Pahsyntie w
EDN (O) 205; Mental Health Education	Open	2	24	50	Mrs S Syiem	Mrs S Syiem	Mrs S Syiem
Total		18	216	450			

3rd Semester

Courses	Core/Open	Credit 5	Contact hours	Mark s	Teachers	TEACHERS (In-charge of Assignment)	Test 1 Test 2 Test 3
EDN (C) 301: ICT in Education	Core	4	48	100	Dr R Lapasam Dr B Sumer	Dr R Lapasam	Dr R Lapasam Dr B Sumer
EDN (O) 302: Comparative Education	Open	4	48	100	Dr E Majaw Dr A Pahsyntiew	Dr E Majaw	Dr E Majaw Dr A Pahsyntiew
Elective I EDN (C) 303.02: Early Childhood Education	Core	4	48	100	Dr R Lapasam Dr A Pahsyntiew	Dr A Pahsyntiew	Dr R Lapasam Dr A Pahsyntiew
Elective II EDN (C) 304.03: Teacher Education I	Core	4	48	100	Dr E Majaw Dr B Sumer	Dr B Sumer	Dr E Majaw Dr B Sumer
EDN (O) 305: Education in Political Perspective	Open	2	24	50	Mrs S Syiem	Mrs S Syiem	Mrs S Syiem

Total	18	216	450	

4th Semester

4 4	48 48	100	Dr E Majaw Dr A Pahsyntiew Dr R	Dr A	
			Dr A Pahsyntiew Dr R	Dr A	Dr A Pahsyntiew
4	48	100	100000000000000000000000000000000000000	ALCOHOLOUS DESCRIPTION OF THE PROPERTY OF THE	Dr R
			Lapasam Dr A Pahsyntiew	Pahsyntiew	Lapasam Dr A Pahsyntiew
4	48	100	Dr E Majaw Dr B Sumer	Dr E Majaw	Dr E Majaw Dr B Sumer
2	24	50	Mrs S Syiem	Mrs S Syiem	Mrs S Syiem
18	216	450			
72	864	1800	**		
	27781			18 216 450	18 216 450

Dr. E. B. Majaw

Department of Education (PG)

Timetable (odd and even)

DEPARTMENT OF EDUCATION

PG TIMETABLE EVEN SEMESTER FEBRAUARY - JUNE SESSION 2022

Day/ Fime	9:30- 10:20	10:2 0-	10:30- 11:30	11: 30- 12: 00	12:00- 1:00	1:00- 2:00	2:00-3:00	3:00-4:00
MO NDA Y	EDN (C) 201: EBM	MO RNI NG ASS EM BLY	EDN (C) 202:AW P	LU NC H BR EA K	EDN (C) 203:RL	EDN (O) 204:BB S	SEMINAR/ PRACTICAL/ EMPLOYABILITY SKILLS	LIBRARY WORK CERTIFICATE COURSE/ NET COACHING
	EDN (C) 405: SS		EDN (C) 402: EBM		EDN (C) 403r BBS	EDN (C) 404: RL	SEMINAR/ PRACTICAL EMPLOYABILITY SKILLS	
TUE SDA Y	EDN (O) 264:RL		EDN (C) 203:BB S		EDN (C) 202: AWP	EDN (C) 201:EB M	EDN (O) 205; 88	LIBRARY WORK/CERTTIFICATE COURSE/ NET COACHING
	EDN (C) 404; BBS		EDN (C) 403:RL		EDN (C) 402:EB M	EDN (C) 401: AWP	SEMINAR/ PRACTICAL/ EMPLOYABILITY SKILLS	
WE D	EDN (C) 201:RL		EDN (C) 204: EBM		EDN (O) 203: BBS	EDN (C) 202:AW P	DEPARMENT MEETING/MENTORIN G	LIBRARY WORK/CERITIFICATE COURSE/ NET COACHING
	EDN (C) 405: SS		EDN (C) 463:RL		EDN (C) 404: AWP	EDN (C) 402: BBS		

THU RSD AV	EDN (C) 202:RL	EDN (O) 204:EB M	EBN (C) 203:BB S	EDN (C) 201: AWP	EDN (O) 295: SS	LIBBARY WORK/CERTTIFICATE COURSE/ NET COACHING
	EDN (C) 402: EBM	EDN (C) 404:RL	EDN (C) 403:AW P	EDN (C) 401:BB S	SEMINAR/ PRACTICAL/ EMPLOYABILITY SKILLS	
FRI	EDN (O) 201: BBS	EDN (O) 203:	EDN (C) 201: EBM	EDN (C) 203 :RL	SEMINAB/ PRACTICAL/ EMPLOYABILITY SKILLS	LIBRARY WORK/CERTTIFICATE COURSE/ NET COACHING
	EDN (C) 405: SS	EDN (C) 401: BBS	EDN (C) 401: RL	EDN (C) 402: EBM	SEMINAR/ PRACTICAL/ EMPLOYABILITY SKILLS	

SEMESTER	п	SEMESTER IV	
EDN (C) 2011	CURRICULUM DEVELOPMENT & INSTRUCTION	EDN (C) 401:	LABORATORY PRACTICAL
EDN (C) 302:	SOCIOLOGY OF EDUCATION	EDN (C) 402:	HIGHER EDUCATION IN INDIA
EDN (C) 203:	EDUCATIONAL TESTING AND EVALUATION	EDN (C) 403:01	GUIDANCE AND COUNSELING
EDN (O) 204:	ENVIRONMENTAL EDUCATION	EDN (C) 404:03	TEACHER EDUCATION -II
EDN (O) 205:	MENTAL HEALTH	EDN (C) 405:	ECONOMICS OF EDUCATION

TEACHER'S INITIAL.

EBM: Dr E B Majaw AWP: Dr Ayophika Pahsyntiew SS: Mrs Sharon Syiem RL:Dr R Lapasam BBS: Mr B. B. Sumer

DEPARTMENT OF EDUCATION

PG TIMETABLE ODD SEMESTER February SESSION 2021

MONDAY	Semester	10:00- 11:00	11:00- 12:00	12:80- 12:30	12:30- 1:30	1:30- 2:30	2:30-3:30	T-L Mode
	1	EBM	AWP	LUNCH BREAK	RL	BBS	LIBRARY WORK	Offin
	ш	AWP	EBM		BBS	RL		
TUESDAY	1	RL	BBS		EBM	AWP	SEMINAR/ PRACTICAL	Office
	ш	BBS	RL		AWP	EBM		
WEDNESDA Y	1	RL	BBS		AWP	ЕВМ	DEPARMENT MEETING	Office
	111	BBS	EBM		RL	AWP	LIBRARY WORK	
THURSDAY	31	EBM	RL		BBS	AWP		Onlin
	m	RL	EBM		AWP	BBS		

FRIDAY	ī	BBS	AWP	RI.	EBM	Onlin e
	ııı	AWP	BBS	EBM	RL	

SEMESTER I		RIII	
EDN (C)	PHILOSOPHICAL FOUNDATIONS OF EDUCATION	EDN (C)	INFORMATION AND COMMUNICATION
101:		301:	TECHNOLOGY - ICT
EDN (C)	ADVANCED EDUCATIONAL	EDN (O)	COMPARATIVE EDUCATION - CE
102:	PSYCHOLOGY	302:	
EDN (C)	EDUCATIONAL MANAGEMENT AND	EDN (C)	ELECTIVE - I
103:	CHANGED	303:	
EDN (C)	RESEARCH METHODOLOGY IN	EDN(C)	ELECTIVE - II
104:	EDUCATION -I	304:	
EDN (C) 105:	RESEARCH METHODOLOGY IN EDUCATION -II	EDN (O) 305:	EDUCATION IN POLITICAL PRESPECTIVE

TEACHER'S INITIAL

EBM: Dr E B Majaw RL: Ayophika Pahsyntiew

Dr R Lapasam

BBS: Mr B. B. Sumer

BS:

Dr B Sungoh

AWP - Ms

Dr. E. B. Majaw

Head

Department of Education (PG)

Synod College, Shillong Department of Political Science (Under-Graduate Section)

Teaching Methods

The Department adopts the following methods of Teaching.

- 1. Lecture method- The Department uses the time tested lecture method for teaching.
- 2. Power Point Presentation
- 3. Seminar method The Department incorporate around 10 percent of the syllabi for seminar where students have to write a paper and make their presentations.
- 4. Assignment For internal assessment, students have to write their assignments.
- 5. Interview method: The Department also conducts interview with students on their assignment.
- 6. Google Meet: During the pandemic period where lockdown were imposed, the Department conducted classes online using goggle meet.
- 7. To aid the teaching-learning process, Google classroom is also used by teachers where assignments and study materials are shared.

2019-2020

Day Section

Sl.	Name of Teacher	Paper/Course	Semester	Honours/Elective
No 1		Paper III- Indian Government and Politics		Honours
	Pynsukmon	Paper: Indian Government and Politics First three Units of the Syllabus	III	Elective
	Mylliemnegap	Paper IV: International Politics	IV	Honours
		Paper II: Major Political System (USA)	II	Elective
2		Paper V: Western Political Thought	V	Honours
	D. 11 . W. 1. 1	Paper VII: Government and Politics in North East India	VI	Honours
	Batskhem Myrboh	Paper III: Indian Government and Politics First three units	III	Elective
		Paper II: Major Political System (UK)		Elective
3		Paper VI: Public Administration	V	Honours
		Paper VIII: Political Sociology	VI	Honours
	Airpeace Well Rani	Paper I: Political Theory Last three units of the syllabus	I	Elective
		Paper II: Major Political System (Russian)		Elective
		Paper I: Political Theory	I	Honours
		Paper II: Major Political Systems	II	Honours
	E. Plieladdalin Nongsiej	Paper I: Political Theory First Three Units	I	Elective
		Paper II: Major Political System (Chinese)	II	Elective

2019-2020 Morning Section

		8		
Paper/Course	Semester	Teacher	Unit	Honours/elective
Paper I: Political Theory	I	S.Hnamte	Unit 3 and 4	Elective and
		E. Plieladdalin Nongsiej	Unit 5 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper II: Major Political Systems	II	S.Hnamte:	Russia and China	Elective and
		E. Plieladdalin Nongsiej	USA	Honours combined
		Brenna Mawlong	United Kingdom	
Paper III: Indian Political System	III	S.Hnamte:	Unit 3 and 5	Elective and
		E. Plieladdalin Nongsiej	Unit 4 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper IV: International Politics	IV	S.Hnamte:	Unit 2 and 3	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 4	
		Brenna Mawlong	Unit 5 and 6	
Paper V: Western Political Thought	V	S.Hnamte:	Part of Unit 1 and	Honours
			whole of 4	
		E. Plieladdalin Nongsiej	Unit 5 and 6	
		Brenna Mawlong	Part of Unit 1 and	
			whole of Units 2 and 3	
Paper VI: Public Administration	V	S.Hnamte:	Unit 3 and 5	Honours
		E. Plieladdalin Nongsiej	Unit 2 and 4	
		Brenna Mawlong	Unit 1 and 6	
Paper VII: Government and Politics in	VI	S.Hnamte:	Unit 2	Honours
North East India		E. Plieladdalin Nongsiej	Unit 2, 4, part of 5 and	
			6	
		Brenna Mawlong	Unit 1, 3 and part of 5	
Paper IV: Political Sociology	VI	S.Hnamte:	Unit 5 and 6	Honours
	[E. Plieladdalin Nongsiej	Unit 1 and 3	
		Brenna Mawlong	Unit 2 and 4	

2020-2021 Day Section

Sl.	Name of Teacher	Paper/Course	Semester	Honours/Elective
No				
1		Paper III- Indian Government and Politics	III	Honours
	Pynsukmon Mylliemnegap	Paper: Indian Government and Politics First three Units of the Syllabus	III	Elective
	1) 110 4 11110 11 11 2 11 11 4 11 11 4 8 4 p	Paper IV: International Politics	IV	Honours
		Paper II: Major Political System (USA)	II	Elective
2		Paper V: Western Political Thought	V	Honours
		Paper VII: Government and Politics in North East India	VI	Honours
	Batskhem Myrboh	Paper III: Indian Government and Politics First three units	III	Elective
		Paper II: Major Political System (UK)		Elective
3		Paper VI: Public Administration	V	Honours
		Paper VIII: Political Sociology	VI	Honours
	Airpeace Well Rani	Paper I: Political Theory Last three units of the syllabus	I	Elective
		Paper II: Major Political System (Russian)		Elective
		Paper I: Political Theory	I	Honours
		Paper II: Major Political Systems	II	Honours
	E. Plieladdalin Nongsiej	Paper I: Political Theory First Three Units	I	Elective

	Paper II: Major Political System	II	Elective
	(Chinese)		

2020-2021 Morning

Paper/Course	Semester	Teacher	Unit	Honours/elective
Paper I: Political Theory	I	S.Hnamte	Unit 3 and 4	Elective and
		E. Plieladdalin Nongsiej	Unit 5 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper II: Major Political Systems	II	S.Hnamte:	Russia and China	Elective and
		E. Plieladdalin Nongsiej	USA	Honours combined
		Brenna Mawlong	United Kingdom	
Paper III: Indian Political System	III	S.Hnamte:	Unit 3 and 5	Elective and
		E. Plieladdalin Nongsiej	Unit 4 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper IV: International Politics	IV	S.Hnamte:	Unit 2 and 3	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 4	
		Brenna Mawlong	Unit 5 and 6	
Paper V: Western Political Thought	V	S.Hnamte:	Part of Unit 1 and	Honours
			whole of 4	
		E. Plieladdalin Nongsiej	Unit 5 and 6	
		Brenna Mawlong	Part of Unit 1 and	
			whole of Units 2 and 3	
Paper VI: Public Administration	V	S.Hnamte:	Unit 3 and 5	Honours
		E. Plieladdalin Nongsiej	Unit 2 and 4	
		Brenna Mawlong	Unit 1 and 6	
Paper VII: Government and Politics in	VI	S.Hnamte:	Unit 2	Honours
North East India		E. Plieladdalin Nongsiej	Unit 2, 4, part of 5 and	
			6	
		Brenna Mawlong	Unit 1, 3 and part of 5	
Paper IV: Political Sociology	VI	S.Hnamte:	Unit 5 and 6	Honours

	E. Plieladdalin Nongsiej	Unit 1 and 3
	Brenna Mawlong	Unit 2 and 4

2021-2022 Day

Sl.	Name of Teacher	Paper	Semester	Honours/Elective
No 1		Paper III- Indian Government and Politics	III	Honours
		r uper in midian Government and ronties	111	Honours
	Pynsukmon Mylliemnegap	Paper: Indian Government and Politics Unit II and III	III	Elective
		Paper IV: International Politics	IV	Honours
2		Paper V: Western Political Thought	V	Honours
		Paper VII: Government and Politics in North	VI	Honours
	Batskhem Myrboh	East India		
		Paper III: Indian Government and Politics	III	Elective
		Unit I and IV		
3		Paper VI: Public Administration	V	Honours
	Airpeace Well Rani	Paper VIII: Political Sociology	VI	Honours
	Anpeace wen Ram	Paper I: Political Theory	I	Elective
		Unit 4		
4	E. Plieladdalin Nongsiej	Paper I: Political Theory	I	Honours
		Paper II: Major Political Systems	II	Honours
		Paper III: Indian Political System	III	Elective
5	Sanbor Tynsong	Paper I: Political Theory	I	Elective
		Paper II: Major Political Systems	III	Elective
		Unit V and VI		

2020-2021 Morning

Paper/Course	Semester	Teacher	Unit	Honours/elective
Paper I: Political Theory	I	S.Hnamte	Unit 3 and 4	Elective and
		E. Plieladdalin Nongsiej	Unit 5 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper II: Major Political Systems	II	S.Hnamte:	Russia and China	Elective and
		E. Plieladdalin Nongsiej	USA	Honours combined
		Brenna Mawlong	United Kingdom	
Paper III: Indian Political System	III	S.Hnamte:	Unit 3 and 5	Elective and
		E. Plieladdalin Nongsiej	Unit 4 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper IV: International Politics	IV	S.Hnamte:	Unit 2 and 3	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 4	
		Brenna Mawlong	Unit 5 and 6	
Paper V: Western Political Thought	V	S.Hnamte:	Part of Unit 1 and	Honours
			whole of 4	
		E. Plieladdalin Nongsiej	Unit 5 and 6	
		Brenna Mawlong	Part of Unit 1 and	
			whole of Units 2 and 3	
Paper VI: Public Administration	V	S.Hnamte:	Unit 3 and 5	Honours
		E. Plieladdalin Nongsiej	Unit 2 and 4	
		Brenna Mawlong	Unit 1 and 6	
Paper VII: Government and Politics in	VI	S.Hnamte:	Unit 2	Honours
North East India		E. Plieladdalin Nongsiej	Unit 2, 4, part of 5 and	
			6	
		Brenna Mawlong	Unit 1, 3 and part of 5	

Paper IV: Political Sociology	VI	S.Hnamte:	Unit 5 and 6	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 3	
		Brenna Mawlong	Unit 2 and 4	

2022-2023 Day

Sl.	Name of Teacher	Paper	Semester	Honours/Elective
No 1		Paper III- Indian Government and Politics	III	Honours
	Pynsukmon Mylliemnegap	Paper: Indian Government and Politics Unit II and III	III	Elective
		Paper IV: International Politics	IV	Honours
2		Paper V: Western Political Thought	V	Honours
	Batskhem Myrboh	Paper VII: Government and Politics in North East India	VI	Honours
	·	Paper III: Indian Government and Politics Unit I and IV	III	Elective
3		Paper VI: Public Administration	V	Honours
	Airmana Wall Dani	Paper VIII: Political Sociology	VI	Honours
	Airpeace Well Rani	Paper I: Political Theory Unit 4	I	Elective
4	E. Plieladdalin Nongsiej	Paper I: Political Theory	I	Honours
		Paper II: Major Political Systems	II	Honours
		Paper III: Indian Political System	III	Elective
5	Sanbor Tynsong	Paper I: Political Theory	I	Elective
		Paper II: Major Political Systems Unit V and VI	III	Elective

2022-2023 Morning

Paper/Course	Semester	Teacher	Unit	Honours/elective
Paper I: Political Theory	I	S.Hnamte	Unit 3 and 4	Elective and
		E. Plieladdalin Nongsiej	Unit 5 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper II: Major Political Systems	II	S.Hnamte:	Russia and China	Elective and
		E. Plieladdalin Nongsiej	USA	Honours combined
		Brenna Mawlong	United Kingdom	
Paper III: Indian Political System	III	S.Hnamte:	Unit 3 and 5	Elective and
		E. Plieladdalin Nongsiej	Unit 4 and 6	Honours combined
		Brenna Mawlong	Unit 1 and 2	
Paper IV: International Politics	IV	S.Hnamte:	Unit 2 and 3	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 4	
		Brenna Mawlong	Unit 5 and 6	
Paper V: Western Political Thought	V	S.Hnamte:	Part of Unit 1 and	Honours
			whole of 4	
		E. Plieladdalin Nongsiej	Unit 5 and 6	
		Brenna Mawlong	Part of Unit 1 and	
			whole of Units 2 and 3	
Paper VI: Public Administration	V	S.Hnamte:	Unit 3 and 5	Honours
		E. Plieladdalin Nongsiej	Unit 2 and 4	
		Brenna Mawlong	Unit 1 and 6	
Paper VII: Government and Politics in	VI	S.Hnamte:	Unit 2	Honours
North East India		E. Plieladdalin Nongsiej	Unit 2, 4, part of 5 and	
			6	

		Brenna Mawlong	Unit 1, 3 and part of 5	
Paper IV: Political Sociology	VI	S.Hnamte:	Unit 5 and 6	Honours
		E. Plieladdalin Nongsiej	Unit 1 and 3	
		Brenna Mawlong	Unit 2 and 4	