



Curriculum for Diploma in Pharmacy



Pharmacy Council of Bangladesh (PCB)

Rahat Tower (4th Floor) 14 Link Road, West Banglamotor
Dhaka 1000

August 2021

Curriculum for Diploma in Pharmacy

Compiled by & edited by:

Centre For Medical Education (CME), DGME

Mohakhali, Dhaka

Supported by:

World Health Organization (WHO), Bangladesh

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Preface

With increasing public expectations about the health care services, specially in the emergency & pandemic situation like COVID 19 the quality of care itself is under scrutiny all over the world. Therefore a positive change is needed in the role of Medical Technologists. The role of teachers and students in teaching and learning to bring a positive changes in allied health professionals education also needs to be reviewed and further developed to make it more competency based.

This revised Health Technology (HT) competency based curriculum has been developed and scientifically designed, making it responsive to the needs of the learners and focussed towards the need of consumers and country. The present HT curriculum with its assessment methods is expected to effectively judge competencies acquired with those which are required to cater the health needs of our people. It is gratifying to note that all concerned in the promotion of allied health science in the country have involved themselves in the planning and formulation of this competency based & community oriented need-based curriculum.

Contents like basic computer science, communicative English, Ethics, communication skills, behavioural science, primary health care, environment and sanitation have been given the required emphasis in this document. Though the curriculum is not the sole determinants of the outcome, yet then it is very important as it guides the faculty members in preparing their instruction, tells the students where to go, what to do and what knowledge, skills and attitude they are expected to develop.

In conclusion, I would like to state that, the curriculum planning process should be continuous, dynamic and never-ending. If it is to serve best, the needs of the individual students, educational institutions and the expectations of people community to whom we are ultimately accountable, are required to be evaluated and given due attention.

I congratulate all who were involved in designing and developing the competency based curriculum, particularly the Director, CME, ADGs & Directors of DGME, Secretary, SMFB, Secretary, PCB, members of the working group and the faculty members of Centre for Medical Education (CME). My special thanks to WR, WHO Bangladesh, Team Leader (Health System) & NPO (HRH) WHO Bangladesh for financial & technical support.

Professor Dr A.H. M. Enayet Hussain
Director General
Directorate General of Medical Education (DGME)

Foreword

Curriculum planning and designing is not a static process, rather a continuous process done regularly through a system. This curriculum was developed a few years back in 2008 but it was needed to be updated to make it more technology oriented students centred and competency based.

Initially there were policy level meetings and meeting of the Curriculum Working Group of different disciplines/courses from Institute of Health Technologies (IHT) to prepare a draft curriculum. Subsequently, in order to develop a consensus, decision was taken to hold Review Workshops through active participation of different groups of faculty members. A taskforce group examined the revised curriculum for the different courses of IHT to give it a final shape with the financial & technical support by WR, WHO Bangladesh & NPO (HRH) WHO Bangladesh.

The revised Curriculum for Health Technology (HT) is expected to be implemented for the newly admitted students of the next session. The success of this curriculum, which is made more competence based and need-based, depends on its proper implementation with active leadership of the MOH&FW, DGME, SMFB, PCB, principals & teachers of IHT with interactive participation of students.

It is expected that this curriculum will serve as present day guideline for the students of IHT and its faculty members. In order to ensure further improvement, this curriculum needs constant review and revision with time to time updating.

My sincere thanks to Prof Dr A.H. M. Enayet Hussain, Director General, DGME, for his guidance & supervision with his team of DGME. My special thanks to Dr. Bardan Jung Rana, WR, WHO Bangladesh, Dr Sangay Wangmo, Team leader (Health System) & Mr Md Nuruzzaman, NPO (HRH), WHO Bangladesh country office for financial & technical support for this activity. I like to thank Professor Dr. Md. Humayun Kabir Talukder, Professor (Curriculum Development & Evaluation), Centre for Medical Education (CME), working co-ordinator, IHT Curriculum Development Committee for his continuous technical assistance and co-ordination to prepare this curriculum. The technical team comprising the faculty members of the Centre for Medical Education (CME) deserve special appreciation.

Lastly, I would like to extend my deep and sincere gratitude to all principals & teachers of different IHTs, subject experts, faculty members and others computer and secretarial support staff of CME who shared their expertise and worked hard to produce this valuable document.

Professor Dr Syeda Shahina Subhan
Director
Centre for Medical Education (CME)

Acknowledgement

This is indeed a pleasant responsibility to bring out this curriculum on Diploma in Health Technology course, which has been developed through a participatory approach by a team of policy teachers of IHTs and medical educationists. It aims to review and update the Health Technology (HT) curriculum.

I would like to express my deep gratitude to Prof Dr A.H. M. Enayet Hussain, Director General, DGME, for his overall supervision in this activity along with ADG (Admin), ADG (Education) & Directors of DGME, under the leadership of whom the plan of reviewing and updating the IHT curriculum has been materialized, and who provided immense support and encouragement to finish the work. My cordial thanks are extended to Dr Sangay Wangmo, Team leader (Health System) & Mr Md Nuruzzaman, NPO (HRH), WHO Bangladesh country office for financial & technical support for this activity.

I am grateful to all the resource persons/teachers from different institutes, subject experts, principals of IHT specially the faculty of Center for Medical Education (CME), who devoted their immense efforts, time and hard work to develop this curriculum. My special thanks to Professor Dr. Md. Humayun Kabir Talukder, Professor (Curriculum Development & Evaluation), Centre for Medical Education (CME), working co-ordinator, IHT curriculum reviewing & updating committee for his continuous efforts without which it would not have been possible to complete this work. My thanks to all other faculty members & staffs of CME, who were involved directly or indirectly in preparation of this curriculum.

Muhammad Mahbubul Haq
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Course Overview

Course Aims:

To prepare Diploma Pharmacists with adequate knowledge and skill to bring about behavioural changes for enabling them to perform assigned responsibilities of Diploma Pharmacists in their individual working stations.

Course Objectives:

After successful completion of the 4 year Diploma-in-Pharmacy course, the students should be able to:

- explain the knowledge and practising skills on medical terminologies relevant to pharmacy course.
- demonstrate knowledge on basic medical subjects such as anatomy, physiology and community medicine.
- demonstrate knowledge on subjects of basic general science such as physics, chemistry, biology and mathematics.
- demonstrate knowledge and skill on Bengali and English (Language and literature) to achieve practising standard in reading, writing and expressing the subjects of study of pharmacy courses.
- identify the different parts of the human body and their functions.
- identify medicinal plants with their chemical nature.
- describe physical and chemical properties of inorganic and organic materials and their uses in pharmaceutical sciences.
- compound and dispense different preparation according to the prescription & give advice to the patient.
- apply knowledge in the qualitative & quantitative measurement of drugs.
- undertake preventive measures related to dispensing Serum, Vaccines, Toxins and toxoid.
- work in a team to provide primary health care.
- give First Aid.
- communicate effectively with the patients, physicians, nurses, staff & other pharmacists.
- implement the National Drug Policy, the Pharmacy Ordinance & Drug Rules.
- identify the different drugs & the dosage forms of drugs.
- deal with adverse effects of commonly used drugs.
- interpret the prescription in respect of drug interaction.
- maintain stock register, prepare annual reports & budget with Drug Storage.
- identify different parts of plants & different systems of animals.
- explain the concept of rational use of drugs.
- use the National Drugs list and Formulary.
- keep abreast with advancement in Pharmaceutical science and also the recent national health reforms.
- explain the knowledge and practising skills on medical terminologies relevant to pharmacy course.
- demonstrate knowledge on basic medical subjects such as anatomy, physiology and community medicine.
- demonstrate knowledge on subjects of basic general science such as physics, chemistry, biology and mathematics.

List of Competencies:

Ability to--

- demonstrate knowledge and skill on Bengali and English (Language and literature) to achieve practising standard in reading, writing and expressing the subjects of study of pharmacy courses.
- identify the different parts of the human body and their functions.
- identify medicinal plants with their chemical nature.
- describe physical and chemical properties of inorganic and organic materials and their uses in pharmaceutical sciences.
- compound and dispense different preparation according to the prescription & give advice to the patient.
- apply knowledge in the qualitative & quantitative measurement of drugs.
- undertake preventive measures related to dispensing Serum, Vaccines, Toxins and toxoid.
- work in a team to provide primary health care.
- give First Aid.
- communicate effectively with the patients, physicians, nurses, staff & other pharmacists.
- implement the National Drug Policy, the Pharmacy Ordinance & Drug Rules.
- identify the different drugs & the dosage forms of drugs.
- deal with adverse effects of commonly used drugs.
- interpret the prescription in respect of drug interaction.
- maintain stock register, prepare annual reports & budget with Drug Storage.
- identify different parts of plants & different systems of animals.
- explain the concept of rational use of drugs.
- use the National Drugs list and Formulary.
- keep abreast with advancement in Pharmaceutical science and also the recent national health reforms.

Course Details

A. Course Title: Diploma-in-Pharmacy.

B. Course philosophy and rational

Diploma Pharmacist is a health technological profession whereby the compounding and dispensing of different preparation according to the prescription is attempted or performed within the gamut of government or private facilities.

Diploma-in-pharmacy course enables the students to acquire a sound foundation in core skill to perform and carry out the above-mentioned tasks and give proper advice to patients about rational use of drugs.

C. Conditions for entrance:

1. Qualifications & prerequisite:
 - (i) SSC Science or equivalent with Science with Physics, Chemistry and Biology.
 - (ii) Candidate has to secure required grade point in the SSC examinations which will be decided by the concern competent authority.
 - (iii) Candidate passed SSC examination in current Year and previous 3rd Year is illegible for admission or as decided by the authority for each year of admission.

D. Examinations for Entrance/Admission Test:

All candidates are to sit for admission tests through prescribed rules and examination method as specified in the advertisement. Selection of the candidates will be done on merit basis as based on marks obtained in the admission test.

Despite the general merit in consideration for selection the reserved quota for different groups of applicants as specified in the advertisement shall be maintained on the merit basis for the respective reserved quota as well. Candidates selected for admission will have to appear before the Medical Boards as organized by the respective Institute of Health/ Medical Technology.

Course structure and duration

Total duration of the course will be 4 years

The course will be of four years' duration. The total period is divided into 4 parts-1st year, 2nd year, 3rd year and 4th year. In each there will be 40 weeks of teaching and learning at the end of which there will be a year final examination. Supplementary examinations will be held 6 months of the year final examination.

Year	Duration
1 st Year	12 months
2 nd Year	12 months
3 rd Year	12 months
4 th Year	12 months

NB: All academic activities including yearly faculty examination of each phase must be completed within the specified time of the phase.

NB: Total duration for completion of the four years (4) course will be 07 years after admission in 1st year

E. Distribution of the papers with teaching /learning hour's as per year wise:

1st year

Exams	Papers	Subjects	Lecture (in hours)	Tutorial (in hours)	Institutional Academic Lab based Practical Training/ Demonstration (in hours)	Formative Exam		Summative exam		Total Hours
						Preparatory leave	Exam time	Preparatory leave	Exam time	
Teaching-learning both formative & summative assessment	I	English	66	34	-	7 days	10 days	10 days	15 days	100
	II	Basic Human Anatomy	70	60	70					200
	III	Basic Human Physiology	75	60	65					200
	IV	Basic Community Medicine & Behavioral science	150	50	-					200
	V	Basic computer science	25	-	75					100
		Total	395	195	210	17 days		25 days		800
		Grand total	800 hours			42 days				800 hours

2nd year

Exams	Papers	Subjects	Lecture (in hours)	Institutional Academic Lab based Practical Training/ Demonstration (in hours)	Formative Exam		Summative exam		Total Hours
					Preparatory leave	Exam time	Preparatory leave	Exam time	
Teaching-learning both formative & summative assessment	I	Physics	40	30	7 days	10days	10 days	15days	70
	II	Chemistry	80	20					100
	III	Basic Microbiology & Parasitology	80	20					100
	IV	Pharmaceutical Chemistry	100	150					250
	V	Pharmacognosy and Microbiology	100	200					300
		Total	370	450	17 days		25 days		820
		Grand total	820 hours		42 days				820 hours

3rd year

Exams	Papers	Subjects	Lecture (in hours)	Institutional Academic Lab based Practical Training/ Demonstration (in hours)	Formative Exam		Summative exam		Total Hours
					Preparatory leave	Exam time	Preparatory leave	Exam time	
Teaching-learning both formative & summative assessment	I	Pharmaceutics	100	150	7 days	10 days	10 days	15 days	250
	II	Pharmacology	100	150					250
	III	General, Community and Hospital Pharmacy	100	150					250
		Total	300	450	17 days		25 days		750
		Grand total	750 hours		42 days				750 hours

4th Year

Exams	Papers	Subjects	Lecture (in hours)	Institutional Academic Lab based Practical Training/ Demonstration (in hours)	Special attachment at relevant lab based advance training (in hours)	Formative Exam		Summative exam		Total Hours
						Preparatory leave	Exam time	Preparatory leave	Exam time	
Teaching-learning & both formative & summative assessment	I	Integrated Health Care	100	20	150	7 days	10 days	10 days	15 days	270
	II	Regulatory Pharmacy & Ethics	80	20	150					250
		Total	180	40	300	17 days		25 days		520
		Grand total	520 hours			42 days				520 hours

F. Teaching & learning methods, media and faculty members

The following teaching and learning methods will be followed:

1. Large Group Teaching Lecture aided by –
 - Multimedia
 - Computer
 - Chalk board
 - OHP/ Slide projector
 - Handouts
2. Small Group Teaching-
 - Tutorial/ Demonstration
 - Students interaction
3. Practical session-
 - Use of practical manual Chalk board
 - Performing the task/examination by the student
 - Writing the practical note book
 - Log book
4. Lab Placement-
 - In small groups for performing activities by the student themselves
5. Faculty members-
 - Subject oriented teacher (Professor/ Associate professor/ Assistant professor/Lecturer/Instructor will be illegible to perform lecture/theoretical class.
 - Subject oriented instructors will be illegible to perform practical/demonstration class.

G. Assessment

- Examination will be held on month of January & July of every year.

A. Assessment Methods:

- There will be in-course/formative (card/ item) and end-course/summative (terminal) assessment for the students in each part (1st, 2nd, 3rd & 4th year) of the course i.e. formative and year final examination.
- There will be year final examination at the end of each academic year and one supplementary examination 6 months after each regular year-final examination.
- Formative assessment will be done through items and cards ending exam.

In the year-final examination marks allocation will be as follows:

- 50% from year-final written examination
- 10% from the formative examinations (Card final examination/Item marks).
- 40% from the oral and practical examinations.
- In written assessment Short Answer Question (SAQ) and Multiple choice question (MCQ)-true/false, in practical along with traditional objective structure practical examination (OSPE) & in oral structure oral examination (SOE) will be utilized

Eligibility for appearing in the year-final examination:

- Certificate from the respective head of institutes regarding students obtaining at least 75% attendance in all aspects (theory, practical, tutorial, residential field practice) during one academic year.
- Obtaining at least 50% marks in the formative examinations.

- No objection Certificate from the respective head of institutes regarding taking part any activities contrary to the discipline of the institute.
- No student shall be allowed to appear in the Year II, Year III and Year IV Final examinations unless the student passes all the subjects of 1st, 2nd and 3rd year Final examinations respectively.

Carry on

- One can be eligible to attend the classes of 2nd year after passing at least 3 subjects among 5 subjects of 1st year.
- One can be eligible to attend the classes of 3rd year after passing at least 3 subjects among 5 subjects of 2nd year.
- One can be eligible to attend the classes of 4th year after passing at least 2 subjects among 3 subjects of 3rd year.

Assessment personnel:

- Subject oriented teacher (Professor/ Associate professor/ Assistant professor/Lecturer will be illegible to be an examiner, moderator and able to evaluate the examination script.
- Subject oriented instructors will be illegible to undertake the practical examinations

Grading

Numerical percentage of Marks	GPA letter Grade	GPA Numerical Grade (Grade points)
85% and above	A ⁺	4
81% to less than 85%	A	3.75
76% to less than 80%	A ⁻	3.5
71% to less than 75%	B ⁺	3.25
66% to less than 70%	B	3.00
61% to less than 65%	B ⁻	2.75
Only 60%	C	2.50
Less than 60%	F	0

Pass Marks/Grade-C

Written Exam - 60%

Practical - 60%

Oral - 60%

Student shall have to pass written, oral, practical and formative separately in each paper of the examination.

Results will be publish in GPA system and number of the subjects will be reflected in the academic transcript.

H. Examinations & distribution of marks as per each year

1st Year Examination

Paper	Subjects	Written Exam	Oral Exam	Practical Exam	Formative Exam	Total Marks
I	English	75	15	-	10	100
II	Basic Anatomy	100	40	40	20	200
IV	Basic Physiology	100	40	40	20	200
V	Basic Community Medicine & Behavioral Science	100	40	40	20	200
VI	Basic computer science	50	--	40	10	100
	Total	425	135	120	80	800

2nd Year Examination

Paper	Subjects	Written Exam	Oral Exam	Practical Exam	Formative exam	Total Marks
I	Physics	75	10	15	--	100
II	Chemistry	75	10	15	--	100
III	Basic Microbiology & Parasitology	100	40	40	20	200
IV	Pharmaceutical Chemistry	100	40	40	20	200
V	Pharmacognosy	100	40	40	20	200
	Total	450	140	150	60	800

3rd Year Examination

Paper	Subjects	Written Exam	Oral Exam	Practical Exam	Formative exam	Total Marks
I	Pharmaceutics	100	40	40	20	200
II	Prarmacology	100	40	40	20	200
III	General, Community and Hospital Pharmacy	100	40	40	20	200
	Total	300	120	120	60	600

4th Year Examination

Paper	Subjects	Written Exam	Oral Exam	Practical Exam	Formative exam	Total Marks
II	Integrated Health Care	100	40	40	20	200
II	Regulatory Pharmacy & Ethics	100	40	40	20	200
	Total	200	80	80	40	400

I. This curriculum is meant for the guidance of four groups for people --

- Students to guide them in what to learn and how to learn
- Teachers to guide them in what to teach and how to teach
- Examiners to guide them in what to evaluated and how to evaluated
- Concerned policy persons to guide how to implement this curriculum with proper--
 - Governance
 - Guidelines
 - Faculty members with updated organogram
 - Institutional academic lab

- Attached OPD
- Special lab attachment as per future job
- Appropriate students friendly academic environment
- Teachers to be oriented about the implementation of curriculum
- Log book to be prepared

J. Required faculty members of the concerned subject/discipline are as follows to implement this curriculum --

- Professor..... 1
- Associate Professor..... 1
- Assistant Professor..... 2
- Lecturer..... 3
- Instructor..... 4
- Technologist..... 5

1st Year

Paper I: Subject - English

Total hours: 100 hour
Lecture: 66 hour
Practical / Tutorial: 34 hours

Total marks-100
Written-75
Oral & practical- 15
Formative 10

Objectives:

At the end of the course the students will be able to: -

- read & write any story in English and attain HSC level English proficiency
- show proficiency in English grammar (article, tense, voice, phrases & idioms)
- write letters in English (private, Official etc).
- translate & retranslate in English
- read and write essays on different topics in English
- develop listening skills in English
- communicate with each other in English
- read and write laboratory reports/findings in English
- follow written and oral instructions in English of the seniors/authorities

List of Competencies

Ability to--

- write Paragraph, Letter, Application & report in English
- show skill in reading, writing ,listening & Conversations in English
- understand & interpret any reports or manuals in English
- read & write any story in English and attain HSC level English proficiency
- write letters in English (private, Official etc.).
- translate & retranslate in English
- read and write essays on different topics in English
- develop listening skills in English
- communicate with each other in English

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial
1.	<p>Text book: English for Today-Published by N.C.T.B. (Intermediate)</p> <p>Unit- Three: Learning English.</p> <ol style="list-style-type: none"> 1. Learning a language 2. Why to learn English 3. How to learn English 4. Different learners, different ways 5. Dealing with grammar 6. Integrated skills development 7. How to use dictionary <p>Unit-Six: Our Environment.</p> <ol style="list-style-type: none"> 1. The environment and the ecosystem 2. How the environment is polluted. 3. The world is getting warmer. 4. Let's not be cruel to them. 5. Beware of pollution. 6. Forests should stay. 7. How to manage waste. <p>Unit-Twenty-four: People, People Everywhere</p> <ol style="list-style-type: none"> 1. What's the problem? 2. Kalim Majhee's boat. 3. The rootless. 4. Why is there discrimination? 5-7. The Revenge. 	16	

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial
2.	Grammar: Articles : <ul style="list-style-type: none"> ▪ Indefinite & definite articles Tense: <ul style="list-style-type: none"> ▪ Present, Past & Future tense Voice : <ul style="list-style-type: none"> ▪ Active voice ▪ Passive voice ▪ Voice change Speeches: <ul style="list-style-type: none"> ▪ Direct speeches ▪ Indirect speeches Linkers <ul style="list-style-type: none"> ▪ In addition ▪ Besides ▪ Moreover ▪ However ▪ Because ▪ Either or , neither nor Idioms & Phrases : Subjects & predicate Parts of speech- <ul style="list-style-type: none"> ▪ Noun & its classification ▪ Pronoun & its classification ▪ Adjective & its classification ▪ Verb-Adverb Conjugation Preposition Punctuation (capitalization, fragment, end, comma, semi colon, colon, hyphen, underlining) Spelling Wrong words Translation (Bengali to English, English to Bengali), short story writing, technical description, comprehension.	22	
	Paragraph writing : Letter writing: Application writing: Report writing :	10	
	Telegrams & E-mail:	2	

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial
	Communicative English :		
	▪ Reading skill	4	8
	▪ Writing skill	4	8
	▪ Listening skill	4	8
	▪ Conversations skill	4	10
	Total	66	34

Teaching Methods:

Lecture

Practical/ Tutorial/Communication

Media:

Multi media,

Laptop,

OHP,

White Board/marker

Black board/ chalk

Wall chart

VCD, DVD, CD

Assessment:

Written – SAQ -75 marks

Practical : Reading, Listening & conversation-15 marks

Formative -10 marks

Paper II : Subject - Basic Anatomy

Total hours: 200 hours
Lecture: 70 hours
Tutorial : 60 hours
Practical/Demons: 70 hours

Total marks-200
Written-100
Oral-40
Practical- 40
Formative- 20

Objectives:

At the end of the course the students will be able to: -

- acquaint with the anatomical terminologies
- demonstrate a comprehensive knowledge base about the major anatomical organ, system and structure of human body
- identify major anatomical organ, system and structure of human body
- identify the specific structures and organs and application of such knowledge in studying their individual disciplines.
- do surface marking of important organ of human body.

List of Competencies:

Ability to--

- demonstrate a comprehensive knowledge base about the major anatomical organ, system and structure of human body
- identify major anatomical organ, system and structure of human body
- identify the specific structures and organs and application of such knowledge in studying their individual disciplines.
- do surface marking of important organ of human body.

Course Contents of Basic Anatomy

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical/ Demonstration
1.	Introductory Anatomy : a) Anatomical Terminologies : i) Definition of Anatomy ii) Anterior, Posterior, superior, inferior, medial, lateral & median plane. b) i) Systems of Human body ii) Human cell: structure and classification. iii) Cell division: types. Phases of mitosis iv) Tissue: Types of tissues.	10	05	10
2.	Musculoskeletal system: ▪ component ▪ Types of bones & joints ▪ short description of important bones	10	10	05
3.	Cardio-vascular system. ▪ Location & Basic structure of cardiovascular system ▪ Short description of heart, major arteries, capillaries/veins	10	05	10
4.	Respiratory system ▪ Basic structure of respiratory system ▪ Description of larynx, trachea, bronchi, bronchioles and alveoli ▪ Gross Anatomy of lung	06	06	10

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical/ Demonstration
5.	Gastro-intestinal and Hepatobiliary system: <ul style="list-style-type: none"> ▪ Short description of the different parts of alimentary system: mouth, tongue, esophagus, stomach, small and large intestine, rectum & anal canal ▪ Anatomy of salivary glands, pancreas, liver, gall bladder 	10	10	10
6.	Genito –urinary system: <ul style="list-style-type: none"> ▪ Anatomy of urinary system ▪ Male genital system: ▪ Female genital system 	10	10	10
7.	Nervous system and Endocrine system. <ul style="list-style-type: none"> ▪ Basic structure of nervous system ▪ Parts of nervous system and short description of brain, spinal cord, cranial nerves, peripheral nerves ▪ Autonomy of nervous system and short description of sense organs-eye, ear, nose, throat, tongue and skin ▪ Important endocrine glands 	12	12	10
8.	Lymphatic System : <ul style="list-style-type: none"> ▪ Anatomy of lymph nodes and vessels 	02	02	05
	Total	70	60	70

Teaching Methods:

Lecture
Tutorial
Practical/ Demonstration

Media:

Multimedia,
Laptop,
OHP,
White Board/Marker,
Black/board
Skeleton
Wall chart
Microscope

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper III : Subject - Basic Physiology

Total hours: 200 hours

Lecture:75 hours

Tutorial: 60

Practical: 65

Total marks-200

Written-100

Oral -40

Practical- 40

Formative- 20

Objectives:

At the end of the course the students will be able to: -

- Demonstrate a comprehensive knowledge on functional aspects of different important components, organs and systems of human body.
- Apply the practical knowledge of human physiology in studying and performing the allotted tasks in their individual discipline.

List of Competencies

- Ability to demonstrate a comprehensive knowledge on functional aspects of different important components, organs and systems of human body.
- Ability to apply the practical knowledge of human physiology in studying and performing the allotted tasks in their individual discipline.

Course Contents of Basic Physiology

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical/ Demonstration
1.	Introductory Physiology: <ul style="list-style-type: none">▪ Physiological terminologies▪ Basic structure and organizations of human body▪ Cell physiology and metabolism/multiplication of living cells▪ General functions of different systems of the body: Musculoskeletal/Respiratory/ Circulatory/Digestive/Urinary/Nervous/ Endocrine/Immune/ Reproductive	10	04	10
2.	Musculoskeletal system : <ul style="list-style-type: none">▪ Physiological components of musculoskeletal system▪ Functions of important muscles, bones & joints of human body▪ Movements of joints	10	10	05
3.	Cardiovascular System: <ul style="list-style-type: none">▪ Functions of circulatory system▪ Composition of Blood and their Functions▪ Conductive system of heart & Cardiac cycle▪ Physiology of Blood Pressure	10	05	10

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical/ Demonstration
4	Respiratory system : <ul style="list-style-type: none"> ▪ Functions of respiratory system ▪ Mechanism of breathing 	05	05	10
5	Digestive and hepatobiliary system: <ul style="list-style-type: none"> ▪ Definition of digestion, absorption, metabolism ▪ Digestion, absorption & metabolism of carbohydrate, fat & protein ▪ Nutritional deficiency disorders : anemia, iodine deficiency, vitamin deficiencies ▪ Functions of liver, pancreas and gall bladder ▪ Composition & functions of different digestive juices & bile 	10	10	10
6	Genitourinary system: <ul style="list-style-type: none"> ▪ Functions of Kidney ▪ Formation, appearance and composition of urine ▪ Functions of reproductive organs of both sexes: uterus/ovary/fallopian tube/vagina/penis/testes/scrotum/vas deferens/prostate 	10	10	10
7	Nervous system, organs of special sense: <ul style="list-style-type: none"> ▪ Functions of motor, sympathetic & parasympathetic nervous system ▪ Functions of cranial nerves ▪ Cerebrospinal fluid formation, composition & function ▪ Functions of special sense organs-eye, ear, nose, tongue and skin ▪ Functions of the endocrine glands & hormones secreted by them: Pituitary / thyroid / parathyroid / adrenal /gonads/pancreas/placenta 	12	10	10
8	Immune System : <ul style="list-style-type: none"> ▪ Definition/classification and components of immune system ▪ Cells and tissues of immune system & their functions 	05	05	
9	Lymphatic System : <ul style="list-style-type: none"> ▪ Structure & functions of lymph nodes and vessels 	03 05	01	
	Total	75	60	65

Teaching Methods: Lecture, Tutorial, Practical/ Demonstration

Media:

Multimedia, Laptop, OHP, White Board/Marker, Black board/chalk, Wall chart, Lab. Reagent & Apparatus, Microscope

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks

Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper IV : Subject – Basic Community Medicine & Behavioural Science

Total hours: 200 hour
Lecture: 150 hour
Practical / Tutorial: 50 hours

Total marks-200
Written-100
Oral-40
Practical- 40
Formative- 20

Objectives

At the end of the course the students will be able to: -

- describe the general aspects of community medicine
- describe the basic concepts of epidemiology
- explain the concept of primary health care
- define organizations of health services and major health program in Bangladesh
- carry on elementary bio-statistics
- describe the concept of Demography and Family Planning
- define Maternal and Child Health (MCH), describe its objectives and explain the importance of ante-natal and post-natal care for mother and children
- define food and nutrition and be aware of nutritional problems in Bangladesh
- acquaint themselves with occupational health hazards and their preventive and protective measures
- describe the principles of health education and their application in the community
- acquaint themselves with environmental pollution and methods of prevention and control of pollution
- explain the basic concept of Essential Service Package (ESP)

List of Competencies:

Ability to --

- describe the general aspects of community medicine
- describe the basic concepts of epidemiology
- explain the concept of primary health care
- define organizations of health services and major health program in Bangladesh
- carry on elementary bio-statistics
- describe the concept of Demography and Family Planning
- define Maternal and Child Health (MCH), describe its objectives and explain the importance of ante-natal and post-natal care for mother and children
- define food and nutrition and be aware of nutritional problems in Bangladesh
- acquaint themselves with occupational health hazards and their preventive and protective measures
- describe the principles of health education and their application in the community
- acquaint themselves with environmental pollution and methods of prevention and control of pollution
- explain the basic concept of Essential Service Package (ESP)

Course Contents of Basic Community Medicine

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Practical/ Demonstration
1.	Introductory community medicine: <ul style="list-style-type: none"> ▪ Definition of Community Medicine ▪ Concept of health : Definition / Dimensions / Spectrum / Determinants / Indicators ▪ Concept of general principles for prevention and control of communicable and Non-communicable diseases ▪ Concept of health promotion: Definition / Interventions 	16	10
2.	Primary health care: <ul style="list-style-type: none"> ▪ Definition/Elements/ Principles/Scope 	05	02
3.	Health care services and organization: <ul style="list-style-type: none"> ▪ Primary/Secondary/Tertiary Health Care services ▪ WHO/UNDP/UNICEF/CARE/ International Red Crescent / BIRDEM / ICDDR,B 	06	02
4.	Basic Epidemiology: <ul style="list-style-type: none"> ▪ Definition /Aims/Methods/Scope ▪ Definition of epidemiological terms eg. Epidemic/Endemic/Pandemic/Sporadic/ Zoonotic disease/ Incubation period/ period of communicability/ Epidemiological Triad/ Infection/ Contamination/ Infestation etc. ▪ Major health programs in Bangladesh ▪ Medical Information system (MIS) 	12	06
5.	Basic Bio-statistics : <ul style="list-style-type: none"> ▪ Definition /Scope/Functions/Importance and uses of Biostatistics, Medical statistics, Health statistics, Vital statistics ▪ Definition of vital events ▪ Definition/types/characteristics/functions/importance/sources/collection and presentation of data ▪ Morbidity/Mortality/Fertility statistics 	17	04

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Practical/ Demonstration
6.	Demography and family planning. <ul style="list-style-type: none"> Demography: Definition/Focus/Process/Stages/Cycle and how to conduct census Family Planning: Definition/ Objectives/ Scope/Health aspects/Benefits Contraceptive methods: Short description /Advantages/Disadvantages/Indications/ Contraindications/ Complications 	12	04
7.	Maternal and Child Health Care (MCH): <ul style="list-style-type: none"> Introduction/Definition/Aims & Objectives / Components of MCH Maternal health care: Antenatal/Intra natal/Postnatal Care of the New-born/Under 5 children Indicators of MCH care: MMR, IMR etc 	10	
8.	Food and nutrition: <ul style="list-style-type: none"> Food: Definition/Functions/Classification Sources/types/functions/daily requirements and deficiency of protein, fat, carbohydrate, vitamins and minerals Definition of nutrition /Balanced Diet Malnutrition: Definition/Forms/Causes and prevention Common nutritional problems of Bangladesh: low Birth Weight/Protein Energy Malnutrition/ Nutritional Blindness/ Nutritional Anemia/ Lathyrism 	15	06
9.	Occupational Health : <ul style="list-style-type: none"> Occupational health : Definition /Objectives Occupational Hazards: Introduction /Types Occupational diseases: Definition/Classification/Prevention and control 	08	02
10.	Health education behavioral science and Ethics: <ul style="list-style-type: none"> Health Education: Definition/Importance / Objectives / Components/ Principles/Methods /Media Communication Skills: Definition/Key elements /Barriers Behavioral Science : Introduction & concept Ethics: Introduction and concept 	12	04

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Practical/ Demonstration
11.	Environment and sanitation: <ul style="list-style-type: none"> ▪ Definition of environment, pollution, sanitation and environmental sanitation ▪ Water: Safe wholesome water/Source of water/water pollution/Hazards of water pollution /water borne diseases/Hardness of water/Purification of water ▪ Air : Definition/Composition ▪ Air pollution : Sources, pollutants, indicators, health & other effects, prevention & control ▪ Ventilation: Definition/Standards/ Types/ Criteria of good ventilation / effects of good ventilation ▪ Solid waste: Definition/Types/Sources/Health hazards ▪ Disposal of solid waste: Dumping/Controlled tipping or sanitary land fill/ incineration/ composting/Manure pits/Burial ▪ Excreta or night soil: Public health importance/Health hazards/how disease occurs from it/Sanitation Barrier/ Methods of excreta disposal (Unsewered area/Sewered area) 	25	04
12.	First Aid : <ul style="list-style-type: none"> ▪ Definition / Principles of First Aid ▪ First Aid Box-List of contents and their uses ▪ First Aid of : Cuts, bleeding, burn, shock, dog bite, snake bite 	12	06
	Total	150	50

Teaching Methods:

Lecture
Tutorial
Practical/ Demonstration

Media:

Multi media, Laptop, OHP, White Board/Marker,
Black board/chalk
Wall chart
Models & Samples

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper V : Subject - Basic Computer Science

Total hours: 100 hour

Lecture: 25 hour

Practical / Tutorial: 75hours

Total marks-100

Written-50

Practical- 40

Formative-10

Objectives:

At the end of the course the students will be able to: -

- acquaint with the modern computer technology
- start, Shutdown and restore the windows
- open, close & edit the file
- develop skills in ms word, ms-excel, power point, internet
- create chart, graph , tables etc.
- install different programs & software
- prepare reports of various investigations
- do internet browsing & other applications of internet

List of Competencies

Ability to--

- deal with the modern computer technology
- show skills in ms word, ms-excel, power point
- prepare reports of various investigations
- internet browsing & other applications of internet

Course Contents of Basic Computer Science

Sl No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial/ Practical
1.	Detailed Contents : Relevant Instruction for Practical : <ul style="list-style-type: none"> Information Technology -its concept and scope Computers for information storage, information seeking, information processing and information transmission Elements of computer system - computer hardware and software: data -numeric data, numeric data; contents of program, processing Computer organization, block diagram of a computer, CPU, memory Input devices; keyboard, mouse etc; output devices; VDU and Printer, scanner, Plotter Electrical requirements, inter-connections between units, connectors and cables Secondary storage; magnetic disks-tracks and sectors, optical disk (CD and DVD Memory), primary and secondary memory: RAM, ROM, PROM etc. Capacity; device controllers, serial port, parallel port system bus 47 Exercises on file opening and closing; memory management; device management; device management and input-output (I/O) management with respect of windows Installation concept and precautions to be observed while installing the system and software Introduction about Operating systems such as and Windows Special features, various commands of MS word and MS- Excel, Power -point About the internet-server types, connectivity (TCOP/IP, shell); applications of internet like: e-mail and browsing Various Browsers like WWW (World wide web); hyperlinks; HTTP (Hyper Text Transfer Protocol); FTP (File Transfer Protocol) Basic of Networking -LAN, WAN, Topologies 	25	
	<ul style="list-style-type: none"> Give a PC, name its various components and list their functions Identification of various parts of a computer and peripherals Practice in installing a computer system by giving connection and loading the system software and application software Installation of DOS and simple exercises on TYPE, REN, DEL, CD, MD, COPY, TREE, BACKUP commands Exercises on entering text and data (Typing Practice) Installation of Windows 98 or 2000 etc. Features of windows as an operating system Start Shutdown and restore Creating and operating on the icons Opening, closing and sizing the windows Using elementary job commands like-creating, saving, modifying, finding and deleting a file Creating and operating on a folder Changing setting like, date, time color (back ground and fore ground) Using short cuts Using on line help 		

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial/ Practical
	<ul style="list-style-type: none"> ▪ MS-WORD ▪ File Management Opening, creating and saving a document, locating files, copying contents in some different file (s), protecting files, Giving password protection for a file ▪ Page set up : Setting margins, tab setting, ruler, indenting ▪ Editing a document : Entering text, Cut, copy, paste using tool-bars ▪ Formatting a document : Using different fonts, changing font size and color, changing the appearance through bold/italic/underlines, highlighting a text, changing case, using subscript and superscript using different underline methods ▪ Aligning of text in document, justification of document, Inserting bullets and numbering : ▪ Formatting paragraph, inserting page breaks and column breaks ▪ Use of headers, footers: Inserting footnote, end note, use of comments ▪ Inserting date, time, special symbols, importing graphic images, drawing tools ▪ Tables and Borders Creating a table, formatting cells, use of different border styles, shading in tables, merging of cells, partition of cells, inserting and deleting row in a table ▪ Print preview, zoom, page set up, printing options ▪ Using Find, Replace options ▪ Using Tools like: Spell checker, help, use of macros, mail merge, word content and statistics, printing envelopes ▪ Using shapes and drawing toolbar ▪ Working with more than one window in MS Word, ▪ How to change the version of the document from one window OS to another ▪ Conversion between different text editors, software and MS word 		30

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture	Tutorial/ Practical
	MS -Excel : <ul style="list-style-type: none"> Starting excel, open worksheet, enter, edit, data, formulas to calculate values, format data, create chart, printing chart, save worksheet, switching from another spread sheet Menu Commands : Create, format charts, organize, manage data, solving problem by analyzing data, exchange with other applications. Programming with MS Excel, getting information while working Work Books : Managing workbooks (create, open, close, save) working in work books, selecting the cells, choosing commands, data entry techniques, formula creation and links, controlling calculations, working with arrays Editing a worksheet, copying, moving cells, pasting, inserting, deleting cells, rows, columns, find and replace text, numbers of cells, formatting worksheet : Creating a chart : Working with chart types, changing data in chart, formatting a chart, use chart to analyze data Using a list to organize data, sorting and filtering data in list Retrieve data with MS -Query: Create a pivot table, customizing a pivot table. Statistical analysis of data. Customize MS-Excel: How to change view of worksheet, outlining a worksheet, customize workspace, using templates to create default workbooks, protecting work Exchange data with other application: linking and embedding, embedding objects, linking to other applications, import, export document 		20
	Power Point : <ul style="list-style-type: none"> Making Slide following the rules & principles Slide Projection 		10
	Internet and its Applications : <ul style="list-style-type: none"> Log -in to internet Navigation for information seeking on internet Browsing and down loading of information from internet Sending and receiving e-mail Creating a message Creating and address book Attaching a file with e-mail message Receiving a message Deleting message 		15
	Total=	25	75

Teaching Methods:

Lecture
Practical

Media:

Computer
Multi media
Computer lab.
Internet connection
White Board
Marker

Assessment:

Written – SAQ- 50 marks
Oral and Practical – 40 marks
Formative – 10 marks

2nd Year

Paper I : Subject - Physics

Total hours: 70 hour
Lecture : 40hour
Practical/Tutorial: 30 hours

Total marks -100
Written – 75
Oral -10
Practical - 15

Objectives:

At the end of the course, the students will be able to-

- define Physics and state the importance of Physics in the Health Care System.
- describe the different systems of measurement and weights.
- demonstrate basic knowledge on measurement of density and specific gravity of a substance.
- demonstrate basic knowledge on fundamental aspects of heat and temperature, sound, light, electricity and magnetism.

List of Competencies:

Ability to

- define Physics and state the importance of Physics in the Health Care System.
- describe the different systems of measurement and weights.
- demonstrate basic knowledge on measurement of density and specific gravity of a substance.
- demonstrate basic knowledge on fundamental aspects of heat and temperature, sound, light, electricity and magnetism.

Course Contents of Physics

Sl.No	Topic/Lessons তত্ত্বীয়	Teaching/Learning Hours	
		Lecture	Practical
১।	বলবিদ্যা ও পদার্থের ধর্ম : ➤ সরল রেখার গতি, গতির সমীকরণ, নিউটনের গতির সূত্র ত্বরণ ও বল, খাত বল, ভেকটর ও সেলের রাশি। ➤ কৌণিক গতি, কৌণিক বেগ ও ত্বরণ বৃত্তাকার পথে গতি, কেন্দ্রভিগ বল। ➤ কাজ, ক্ষমতা ও শক্তি, শক্তির সংরক্ষণ নীতি। ➤ সরল দোল গতি, সরল দোলক ➤ আর্কিমিডিসের সূত্র ও তার প্রয়োগ আপেক্ষিক গুরুত্ব নির্ণয়।	০৮ ঘন্টা	
২।	তাপ : তাপমিতি, তাপের একক, আপেক্ষিক তাপ, তাপীয় ক্ষমতা পানিসম ও সুপ্ততাপ এবং হাইড্রোজেন নির্ণয় পদ্ধতিঃ সরলীকৃত পদ্ধতিতে তাপের পরিবাহিতা নির্ণয়।	৫ ঘন্টা	
৩।	শব্দ : ➤ শব্দের উৎপত্তি ও শব্দ সালন, আড় তরঙ্গ ও দীঘল তরঙ্গ শব্দের ব্যভিচার ও বীট। বীটের সাহায্যে কম্পন সংখ্যা নির্ণয়। ➤ শব্দের বেগ নির্ণয়। ➤ টানা তারের আড় কম্পন, সূত্রের প্রমাণ।	৫ ঘন্টা	

৪।	আলোকঃ ➤ গোলায় পৃষ্ঠে প্রতিফলন। ➤ সমতল ও গোলায় পৃষ্ঠে প্রতিফলন। সম্পূর্ণ প্রতিফলন, প্রতিসরাংক, প্রিজম প্রতিসারণ। ➤ লেন্সঃ উত্তল ও অবতল লেন্স। লেন্সের শক্তি ও বিবর্ধন লেন্স সংযোজন। চোখের ত্রুটি সমূহ ও প্রতিকার। ➤ আলোক যন্ত্র-মাইক্রোস্কোপ।	৫ ঘন্টা	
৫।	চুম্বকঃ ➤ চুম্বকের বিভিন্ন পদ্ধতিঃ চুম্বকের মতবাদ, চুম্বকের ক্ষেত্র ও প্রবাল্য। বিপরীত বর্গীয় সূত্র প্রাপ্তমুখী ও প্রস্থমুখী অবস্থানে চুম্বকের প্রাবল্য। বিক্ষেপী চুম্বকমান যন্ত্র ও ইহার ব্যবহার। ➤ ভূচুম্বকত্ব।	৪ ঘন্টা	
৬।	তড়িৎঃ ➤ স্থির তরিৎ, চার্জের অস্তিত্ব ও প্রকৃতি নির্ণয়। বৈদ্যুতিক আবেশ, কুলম্বের সূত্র, ধারকত্ব, তড়িৎ বিভব। সমান্তরাল পাত ধারক। ➤ বিদ্যুৎ কোষ, তাদের কেন্দ্রে উৎপন্ন চুম্বকক্ষেত্র। বিদ্যুৎ প্রবাহ ও চার্জের একক। ➤ ওহমের সূত্র, বিভব বৈষম্যের একক। রোধ ও আপেক্ষিক রোধ, রোধের একক, রোধ সংযোজন, এমিটার, ভোল্ট মিটার। ➤ বৈদ্যুতিক পরিমাপ, হুইট স্টোম ব্রিজ, মিটার ব্রিজ, পোস্ট অফিস বক্স ও পাটেন শিও মিটার। ➤ তড়িৎ প্রবাহ ও উত্তাপ, জুলের সূত্র, বৈদ্যুতিক পদ্ধতিতে নির্ণয়। ➤ তড়িৎ প্রবাহে রাসায়নিক ক্রিয়া, তড়িৎ বিশেষণ, সূত্র ও ইহাদের প্রমাণ। ➤ তড়িৎ চুম্বকীয় আবেশ।	১৩ ঘন্টা	
	ব্যবহারিক	৪০	

Sl.No	Topic/Lessons	Teaching/Learning Hours	
		Lecture	Practical
৭।	১। শাইড ক্যালিপার্স, স্ক্রজ ও স্পেরোমিটারের ব্যবহার শিক্ষা। ২। পানি অপেক্ষা হালকা/ভারি তরল ও কঠিন পদার্থের হাইড্রো-স্টেটিক ব্যালেন্স, নিকলসন হাইড্রোমিটার ও আঃ হাইড্রো বোতলের সাহায্যে আপেক্ষিক গুরুত্ব নির্ণয়। ৩। সরল দোলকের সাহায্যে জি এর মান নির্ণয়। ৪। একটি ক্যালরিমিটারের সাহায্যে পানিসম নির্ণয়। ৫। কঠিন ও তরলের আপেক্ষিক তাপ নির্ণয়। ৬। অবতল দর্পনের ফোকাস দূরত্ব নির্ণয়। ৭। প্যারালাক্স পদ্ধতিতে উত্তল লেন্স ফোকাস দূরত্ব নির্ণয়। ৮। একখানা কাচ ফলকের প্রতিসরাংক নির্ণয়। ৯। ওহমের সূত্রের সত্যতা নির্ণয়। ১০। যে কোন দৈর্ঘ্যের তারে আপেক্ষিক রোধ নির্ণয়। ১১। নাল পদ্ধতিতে দুইখানা দ্রব্য চুম্বকের চৌম্বক ড্রামকের তুলনা।		৩ ঘন্টা ৩ ঘন্টা ৩ ঘন্টা ২ ঘন্টা ৩ ঘন্টা ২ ঘন্টা ২ ঘন্টা ৩ ঘন্টা ৩ ঘন্টা ৩ ঘন্টা ৩ ঘন্টা
	মোটঃ ৭০ ঘন্টা	৪০	৩০

মান বন্টনঃ তত্ত্বীয় = ৬০

১। পদার্থের সাধারণ ধর্ম, আলোক ও তড়িৎ প্রতিটি শাখা থেকে ৮ নম্বরের দুটি ও ৪ নম্বরের ২টি করে মোট (৬টি + ৬টি) = ১২টি প্রশ্ন আকারে। তন্মধ্যে ৮ নম্বরের ১টি করে ৩ শাখায় ৩টি ও ৪ নম্বরের ১টি করে ৩ শাখার ৩টি অর্থাৎ মোট ৬টি প্রশ্নের উত্তর দিতে হবে।

$$8 \times 1 \times 3 = 24$$

$$4 \times 1 \times 3 = 12$$

২। শব্দ ও তাপ ও চুম্বকতত্ত্বঃ প্রতিটি শাখা থেকে ৪ নম্বরের ৪টি করে মোট ১২টি প্রশ্ন থাকবে। সেগুলোর মধ্যে থেকে ২টি করে মোট ৬টি প্রশ্নের উত্তর দিতে হবে।

$$4 \times 2 \times 3 = 24$$

দ্রষ্টব্যঃ বলবিদ্যা ও পদার্থের ধর্ম থেকে ও অন্য যে কোন শাখা থেকে ১টি পরীক্ষণ করতে হবে।

ব্যবহারিকঃ ক্লাস রেকর্ড ৯+১ নং ও ২নং পরীক্ষণ ৮ করে = ১৫ মার্কস

মৌখিক ও ফরমেটিভ = ১০, লিখিত = ৭৫ মার্কস

মোটঃ তত্ত্বীয়+ব্যবহারিক+মৌখিক = ১০০ মার্কস

Paper II: Subject - Chemistry

**Total hours: 100 hour
100**

Lecture : 80 hour

Practical/Tutorial: 20 hours

Total marks -

Written – 75

Oral - 10

Practical - 15

Objectives:

At the end of the course, the students should be able to:

- describe fundamentals in physical chemistry.
- explain common laboratory process.
- identify organic and inorganic chemical compounds.
- describe the different aspects of metals, non-metal and gaseous substances.

List of Competencies:

Ability to--

- describe fundamentals in physical chemistry.
- explain common laboratory process.
- identify organic and inorganic chemical compounds.
- describe the different aspects of metals, non-metal and gaseous substances.

Course contents of Chemistry

Sl.No	Topic/Lessons	Teaching/Learning Hours	
		Lecture	Practical
	গ্রুপ -ক ভৌত রসায়ন		
১।	ভৌত ও রাসায়নিক পরিবর্তন ও এদের মধ্যে পার্থক্য।	১ ঘন্টা	
২।	পদার্থের গঠনঃ অণু ও পরমাণু-অণুর সংজ্ঞা, আন্তঃআণবিক দূরত্ব, আন্তঃআণবিক, কঠিন, তরল, গ্যাস, পরমাণু, পারমাণবিক ও আনবিক ওজন।	৫ ঘন্টা	
৩।	সাধারণ পরীক্ষাগার প্রণালীঃ দ্রবণ, অভিস্রবণ, পরিস্রাবণ ও অতিপৃক্ত দ্রবণ, দ্রাব্যতা, বাষ্পীভবন, পাতন, আংশিক পাতন, উর্ধ্বপাতন, কেলসন।	৪ ঘন্টা	
৪।	প্রতীক, সংকেতঃ প্রতীক, আনবিক সংকেত, যোজ্যতা, রেডিক্যাল এবং তাদের যোজনী, যোজনী থেকে আনবিক সংকেত নির্ণয়, গাঠনিক সংকেত।		
৫।	রাসায়নিক বিক্রিয়াঃ বিভিন্ন প্রকারের রাসায়নিক বিক্রিয়া, রাসায়নিক বিক্রিয়া ঘটানোর উপায় সমূহ।	৪ ঘন্টা	
৬।	অম্ল, ক্ষারক ও লবন।		
৭।	গ্যাসের ধর্ম-বয়েলের সূত্র, চার্লসের সূত্র।	৪ ঘন্টা	
৮।	মৌলের রাসায়নিক তুল্যাংক বা যোজন ভার।	২ ঘন্টা	
৯।	পরমানুর গঠন এবং যোজ্যতার ইলেকট্রনীয় মতবাদ।	২ ঘন্টা	
	বিভিন্ন রাসায়নিক বন্ধন।	২ ঘন্টা	
১০।	ক) এভোগ্যাড্রো সূত্র খ) ভরক্রিয়া সূত্র।	৪ ঘন্টা	
১১।	রাসায়নিক সংযোগ বিধিঃ		
	ক) ভরের নিত্যতা সূত্র।	২ ঘন্টা	
	খ) নির্দিষ্ট অনুপাত সূত্র।	৫ ঘন্টা	
	গ) গুণানুপাত বিধি।		
	ঘ) বিপরীত অনুপাত সূত্র।		
	ঙ) গ্যাস আয়তন সূত্র।		
	গ্রুপ -খ অধাতুঃ		

Sl.No	Topic/Lessons	Teaching/Learning Hours	
		Lecture	Practical
	১। নিম্নোক্ত পদার্থ গুলোর উৎস, প্রস্তুতি, ধর্ম এবং ব্যবহারঃ ক) অক্সিজেন, ওজোন, পানি ও হাইড্রোজেন পার অক্সাইড। খ) হোলাজেন সমূহঃ ক্লোরিন, রোমিন, আয়োডিন ও হাইড্রো ক্লোরিক এসিড। গ) নাইট্রোজেন, হাইড্রোজেন সালফাইট, সালফার ডাইঅক্সাইড। ঘ) সালফার, হাইড্রোজেন সালফাইট, সালফার ডাইঅক্সাইড, সালফিউরিক এসিড। ঙ) ফসফরাস চ) জারন-বিজারনঃ জারক ও বিজারক পদার্থ ২। ধাতুঃ নিম্নোক্ত পদার্থ গুলোর উৎস, প্রস্তুতি, ধর্ম এবং ব্যবহারঃ ক) সোডিয়াম-সোডিয়াম হাইড্রোঅক্সাইড, সোডিয়াম কার্বনেট, সোডিয়াম ক্লোরাইড। খ) ক্যালসিয়াম-ক্যালসিয়াম কার্বনেট, ক্যালসিয়াম ফ্লোরাইড, ক্যালসিয়াম সালফেট, বি-চিং পাউডার। ৩। কপার -কপার অক্সাইড, কপার সালফেট, কপার ফ্লোরাইড ৪। জিংক - জিংক অক্সাইড, জিংক ফ্লোরাইড, জিংক সালফেট।	৭ ঘন্টা ৬ ঘন্টা ১ ঘন্টা ১ ঘন্টা	
	৫। এলুমিনিয়াম - এলুমিনিয়াম ফ্লোরাইড, এলুমিনিয়াম সালফেট। ৬। আয়রন - আয়রন সালফেট। ৭। লেড - লেড অক্সাইড। ৮। সিলভার - সিলভার নাইট্রেট।	১ ঘন্টা ১ ঘন্টা ১ ঘন্টা ১ ঘন্টা	
	গ্রুপ - গ জৈব রসায়ন		
	১। জৈব রসায়নের সংজ্ঞা, জৈব ও অজৈব যৌগের মধ্যে পার্থক্য জৈব যৌগের গঠন, শ্রেণী বিভাগ, কার্যকরী বা ফ্রিশীল মূলক। ২। জৈব যৌগের নিষ্কাশন ও বিশুদ্ধকরণ ৩। সম্পৃক্ত ও অসম্পৃক্ত হাইড্রোকার্বনঃ প্রস্তুত প্রণালী, ধর্ম এবং ব্যবহার -মিথেন, ইথেন, ইথিলিন, এসিটাইলিন। ৪। এলকোহল হ্যালাজেন জাতকঃ মিথাইল ফ্লোরাইড, ক্লোরোফর্ম এর প্রস্তুতি, ধর্ম ও ব্যবহার। ৫। এলকোহলঃ শ্রেণী বিভাগ, মিথাইল এলকোহল, ইথানল এলকোহল ও গিসারিনের প্রস্তুতি, ধর্ম ও ব্যবহার। ৬। ডাই-ইথাইল ইথারঃ প্রস্তুতি, ধর্ম ও ব্যবহার। ৭। এলডিহাইড ও কিটোল সমূহঃ নিম্নলিখিত যৌগসমূহের প্রস্তুতি, ধর্ম ও ব্যবহার, ফরমালডিহাইড, এসিটালডিহাইড ও এসিটোন। ৮। কার্বলিক এসিডঃ এসেটিক এসিড ও সাইট্রিক এসিডের প্রস্তুতি, ধর্ম ও ব্যবহার। ৯। এলকোহল এ্যামাইনঃ এ্যামাইনের শ্রেণী বিভাগ, মিথাইল এ্যামাইন ও ইথাইল এ্যামাইনের প্রস্তুতি, ধর্ম ও ব্যবহার। ১০। এ্যারোমেটিক যৌগঃ নিম্নলিখিত যৌগসমূহের প্রস্তুতি, ধর্ম ও ব্যবহার। বেনজিন, টলুইন, ফ্লোরোবেনজিন নাইট্রোবেনজিন, অ্যানিলিন, কার্বলিক এসিড, বেনজালডিহাইড, বেনজোয়িক এসিড ও স্যালিসাইলিক এসিড।	৪ ঘন্টা ১ ঘন্টা ২ ঘন্টা ৪ ঘন্টা ২ ঘন্টা ১ ঘন্টা ৩ ঘন্টা ৩ ঘন্টা ২ ঘন্টা ৪ ঘন্টা	
	ব্যবহারিক :		
	১। অম্ল ও ক্ষারের মাত্রা নির্ণয়। ২। হাইড্রোজেন ও অক্সিজেনের প্রস্তুতি। ৩। সহজ জৈব ও অজৈব যৌগের আঙ্গিক বিশেষণ।		২০ ঘন্টা
	মোট : ১০০ ঘন্টা	৮০ ঘন্টা	২০ ঘন্টা

মান বন্টন : লিখিত পরীক্ষা=৭৫ মার্কস, ব্যবহারিক = ১৫মার্কস, মৌখিক/ফরমেটিভ =১০ মার্কস

গ্রুপ - ক- ২০ নম্বর

গ্রুপ - খ - ২০ নম্বর

গ্রুপ - গ - ২০ নম্বর

গ্রুপ -ক থেকে ৩টি, গ্রুপ -খ থেকে ৩টি এবং গ্রুপ -গ থেকে ৩টি মোট ৯টি প্রশ্ন থাকবে। তন্মধ্যে প্রত্যেক গ্রুপ থেকে অন্ততঃপক্ষে ২ টি করে মোট ৬টি প্রশ্নের উত্তর দিতে হবে।

Paper III: Subject - Basic Microbiology & Parasitology

Total hours: 100-hour

Lecture: 80 hour

Practical: 20 hours

Total marks-200

Written-100

Oral-40

Practical- 40

Formative- 20

Learning objectives:

At the end of the course the students will be able to –

- Define and classify microorganisms, define and explain microbiological terminologies.
- Identify, use and maintain microbiological articles, equipment, apparatus including microscope and mention parts when applicable.
- Clean, wash, decontaminate, disinfect & sterilization microbiological articles, instruments, glass wares etc.
- Define, classify, and mention morphology of bacteria, virus, fungus, parasite and helminth.
- Name medically important bacteria, virus, fungus, parasite, helminth and diseases caused by them.
- Explain anatomy bacteria and bacterial spores: pathogenicity of medically important bacteria, growth & multiplication of bacteria.
- Identify, staining and culture medically important bacteria.
- Mention knowledge about PPE
- Demonstrate basic knowledge of immunity.

List of Competencies:

1. demonstrate basic knowledge on common microbiological and parasitological issues.
2. perform identification of different microorganisms particularly bacteria & fungus of medical importance ensuring laboratory safety using microbiological, reagents, equipment and apparatus.
3. provide best services to the stakeholders using the knowledge and skills.

Course Contents of Basic Microbiology & Parasitology

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture / Tutorial on Theories	Practical/ Demonstration/Field visit
1.	Introduction to microorganisms: <ul style="list-style-type: none"> ▪ Definition and classification of microorganisms ▪ Microbiological terminology ▪ Characteristics of Eukaryotic prokaryotic & sub cellular groups of microorganisms ▪ Microbiological articles, equipment's apparatus ▪ Microscope: Different parts of microscope, & maintenance of microscope 	08	03
2.	Destruction of microorganism: <ul style="list-style-type: none"> ▪ Cleaning, Washing, decontamination disinfection & procedures ▪ Sterilization of different laboratory articles, instruments, glass wares etc. 	07	03
3.	Bacteria: <ul style="list-style-type: none"> ▪ Anatomy of Bacteria, chemical composition of different structures of bacteria ▪ Bacterial Spore: Definition & function spores, Spores bearing bacteria of medical importance ▪ Bacterial toxin: Definition & types of bacterial toxin, characteristics of endotoxin & exotoxin, Toxin producing organism of medical importance, use of bacterial toxins in diseases prevention ▪ Biology of bacteria: Growth & multiplication of bacteria, bacteria growth curve, bacteria growth requirements. Definition & classification of culture media ▪ Classifying bacteria in terms of morphology, staining, spore, flagella, capsule & Pathogenicity. ▪ Staining bacteria: Gram's staining, AFB staining, Albert staining 	15	04
	Virus: <ul style="list-style-type: none"> ▪ General characters of virus ▪ Morphology & classification of virus ▪ List of viruses of medical importance & diseases produced by them 	10	01

Sl. No	Topics/Lessons	Teaching/learning Hours	
		Lecture / Tutorial on Theories	Practical/ Demonstration/Field visit
	Fungus: <ul style="list-style-type: none"> General character, Morphology and classification of fungus List of fungus list medical important and the diseases produced by them 	10	02
	Parasite: <ul style="list-style-type: none"> Definition /Classification of parasite 	03	01
	Helminth: <ul style="list-style-type: none"> General characteristics of helminths Classification /Morphology of helminths 	08	02
	Protozoa: <ul style="list-style-type: none"> General characteristics of protozoa Definition /Classification of protozoa 	10	02
	PPE: <i>Personal protective equipment (PPE)</i> for different healthcare activities	04	01
	Immunity: Basic Concept of immunity and immunization Schedule.	05	01
	Total	80	20

Teaching Methods:

- Lecture
- Tutorial
- Practical/ Demonstration
- Field visit

Media:

- Multimedia and Laptop
- OHP and transparencies
- White Board and markers
- Blackboards and chalk
- Online and computer based teaching learning materials
- Laboratory: (Microscope, Autoclave, Hot Air Oven, Incubator, Haemocytometer, Haemoglobin meter, Analytical balance, Centrifuge machine, Rotator, Refrigerator, Photometer, Electrolyte analyzer, Electrophoresis apparatus, ELISA reader, PCR machine, Cell counter etc.)
- Hospital/ Health complex

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks

Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper IV: Subject- Pharmaceutical Chemistry

Total hours: 250 hours
Lecture : 100 hours
Tutorial/Practical : 150 hours

Total marks : 200
Written : 100
Oral : 40
Practical : 40
Formative : 20

Objectives:

At the end of the course, the students will be able to

- Describe the chemical and physical properties of substances used in medicine.
- Explain the techniques of quality control of drugs
- show basic knowledge about various official pharmacopoeia (B.N.F, B.P, B.P.C, U.S.P).
- identify poisonous drugs & narcotics drugs.
- Maintain quality storage conditions

List of Competencies :

Ability to--

- describe the chemical and physical properties of substances used in medicine.
- explain the techniques of quality control of drugs
- show basic knowledge about various official pharmacopoeia (B.N.F, B.P, B.P.C, U.S.P).
- identify poisonous drugs & narcotics drugs.
- Maintain quality storage conditions

List of Competencies:

Competencies related to Pharmaceutical Chemistry to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding of

- Basic Chemical & Physical properties of Substances that are used as Medicine.
- Various official pharmacopoeia (B.N.F, B.P, B.P.C, U.S.P).
- Various inorganic compounds including medical and pharmaceutical uses and storage conditions.
- Quality control of drugs.
- Pharmaceuticals Importance of quality control, significant errors, Methods used for quality control, sources of impurities in pharmaceuticals.
- Preparation, properties and uses of Various Pharmaceuticals.

B) Skill –

- Identification of Identify various Chemicals (Generic Name) that are used as Medicine.
- Labeling of drugs and Chemicals:-
 - a) Nature of the Drugs, poisonous drugs to be labeled.
 - b) Batch and expiry date of drugs.
- Identification of Identify poisonous drugs.
- Identification of identify narcotics drugs.
- maintenance of Maintain quality storage conditions.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.
- Communicating with patients regarding Chemical that are used as drug.
- Helping attitude with sense of sympathy and empathy

List of Competencies

Ability to--

- describe the chemical and physical properties of substances used in medicine.
- explain the techniques of quality control of drugs
- show basic knowledge about various official pharmacopoeia (B.N.F, B.P, B.P.C, U.S.P).
- identify poisonous drugs & narcotics drugs.
- identification of identify narcotics drugs.
- maintain quality storage conditions

Course contents:

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical
1	<i>An introduction to Pharmaceutical Chemistry:</i> □ Definition, Branches and Scope	02	01	-
2	<i>An introduction to various official Pharmacopoeia:</i> □ British National Formulary (B.N.F) □ British Pharmaceutical codex (B.P.C) □ British Pharmacopoeia (B.P) □ Extra Pharmacopoeia (Martindale) □ Pharmaceutical Handbook □ The International Pharmacopoeia □ The United States Pharmacopoeia (U.S.P)	03	02	-
3	Inorganic Pharmaceutical Chemistry	40	20	

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical
	General discussion on the following inorganic compounds including important physical and chemical properties, medical and pharmaceutical uses, storage conditions and chemical incompatibility.			
	a) Acids, Bases, Antioxidants and Preservatives:	10	07	
	<input type="checkbox"/> Boric acid. <input type="checkbox"/> Hydrochloric acid <input type="checkbox"/> Sodium hydroxide <input type="checkbox"/> Potassium hydroxide. <input type="checkbox"/> Citric Acid. <input type="checkbox"/> Sodium citrate. <input type="checkbox"/> Sodium phosphate.	03	01	
	b) Gastrointestinal agents:			
	i) Acidifying agent:			
	<input type="checkbox"/> Hydrochloric acid.	03	01	
	ii) Anta-acids:			
	<input type="checkbox"/> Sodium bicarbonate. <input type="checkbox"/> Aluminum hydroxide gel. <input type="checkbox"/> Magnesium Carbonate.	03	01	
	c) Topical agents:			
	i) Protective:			
	<input type="checkbox"/> Zinc Oxide <input type="checkbox"/> Calamine,	03	01	
	ii) Astringents:			
	<input type="checkbox"/> Zinc Sulphate.	06	02	
	d) Inorganic compounds used in dentistry			
	<input type="checkbox"/> Sodium fluoride <input type="checkbox"/> Calcium salts.	03	07	
	e) Radiopharmaceuticals			
	<input type="checkbox"/> Definition and handling of Radiopharmaceuticals and measurement of radiation with GM Counter.	1.5		
	Alpha, Beta, Gama Radiations, Radio Isotopes of Iodine ¹³¹ .			
	<input type="checkbox"/> Hydrogen peroxide <input type="checkbox"/> Potassium permanganate <input type="checkbox"/> Iodine <input type="checkbox"/> Solutions of Iodine <input type="checkbox"/> Lead and heavy metals <input type="checkbox"/> Iron and ammonium citrate	1.0		
		1.0		

Sl. No	Topics/Lessons	Teaching/learning Hours		
4	<u>Quality Control of active pharmaceutical ingredients.</u> <ul style="list-style-type: none"> <input type="checkbox"/> Define Quality control and Quality assurance. <input type="checkbox"/> Describe sources of impurities in pharmaceutical ingredients. <input type="checkbox"/> Explain melting point, boiling point, specific gravity of inorganic ingredients. <input type="checkbox"/> Determination of concentration of solution. <ol style="list-style-type: none"> 1) Different ways of expressing the concentration of solutions. <ul style="list-style-type: none"> <input type="checkbox"/> Molarity, <input type="checkbox"/> Normality. <input type="checkbox"/> Molality. <input type="checkbox"/> Percentage. 2) Titration. <ul style="list-style-type: none"> <input type="checkbox"/> Acid-base titration. <input type="checkbox"/> Redox titration. 	03 03 03 03 03 03	03 02 02 02 02 02	
5	Preparation, properties and uses of the following Pharmaceuticals:			
	<ul style="list-style-type: none"> <input type="checkbox"/> Rifampicin <input type="checkbox"/> Penicillin, Ampicillin <input type="checkbox"/> Diazepam, Nitrazepam <input type="checkbox"/> Salbutamol <input type="checkbox"/> Furosemide <input type="checkbox"/> Insulin <input type="checkbox"/> Morphine, Pethidine <input type="checkbox"/> Actinomycin, Busulphan <input type="checkbox"/> Cotrimoxazole <input type="checkbox"/> Metronidazole <input type="checkbox"/> Acetyl Salicylic Acid and Paracetamol <input type="checkbox"/> Omerazole <input type="checkbox"/> Fexofenadine <input type="checkbox"/> Metformin 	03 03 03 02 03 03 03 02 03 02 03 03 02 03	01 01 01 01 01 01 01 01 01 01 01 01 01 01	
6.	Practical			
	1. Preparation of Pharmacopoeial standard – distilled water and Hydrochloric acid.			35
	2. Preparation of Normal Saline (Sodium Chloride).			35
	3. Preparation of Dextrose Saline.			30
	Total=	100	50	100

Teaching Methods:

Lecture

Practical Demonstration

Media:

Multi media

OHP

White Board/ black board

Marker

Chemicals/reagents/instruments

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks

Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper V – Subject: Pharmacognosy

Total hours : 300 hours

Lecture : 100 hours

Practical : 200 hours

Total marks : 200

Written : 100

Oral : 40

Practical : 40

Formative : 20

Objectives:

At the end of the course, the students will be able to:

- Define Pharmacognosy
- Describe history and scope of Pharmacognosy
- Identify the drugs derived from plants and animals
- Describe the official methods of drug evaluation
- Describe the important active constituents, tests of identity, uses of different drugs
- Explain comprehensive knowledge of different aspects of microbiology
- Use microscope in the laboratory.

List of competencies (supplied)

Competencies related to Pharmacognosy to be acquired by the Diploma Pharmacist are -

A) Knowledge and Understanding of

- History, Scope, Importance and Subject Matters of Pharmacognosy.
- Various Crude Drugs & their related things.
- Organized & unorganized Drugs.
- Methods of drug evaluation
- Different Methods of Adulteration of crude drugs.
- Official, Unofficial & Non-official Drugs.

B) Skill –

- Various Crude Drugs, their Pharmacological action and Uses.

C) Attitude –Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.

List of Competencies:

Ability to--

- define Pharmacognosy with its history and scope
- identify the drugs derived from plants and animals.
- describe the official methods of drug evaluation.
- describe the important active constituents, tests of identity, uses of different drugs.
- explain comprehensively different aspects of microbiology.
- use microscope in the laboratory.

Course contents:

Sl. No	Topics/Lessons Pharmacognosy	Teaching/learning Hours		
		Lecture	Tutorial	Practical
1	<p><i>General Introduction:</i></p> <ul style="list-style-type: none"> ❑ Definition, History, Scope, Importance and Subject Matters of Pharmacognosy. ❑ Classification of drugs viz. alphabetical, morphological, chemical-pharmacological, taxonomical and chemo-taxonomical methods. ❑ Drugs and technical products. ❑ Crude drugs: Cultivation, Collection, Processing and storage of crude drugs. Conservation of medicinal plants. ❑ Preparation of drugs for the commercial market. ❑ Evaluation of drugs. A detailed study of different types of evaluation of drugs. ❑ Drug adulteration. Different methods of adulteration of crude drugs and general methods for detection of adulterants. ❑ Official drugs, Non Official drugs and Unofficial drugs. 	<p>04</p> <p>04</p> <p>04</p> <p>04</p> <p>04</p> <p>04</p> <p>04</p> <p>02</p>	<p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p>	-
2	<p>Study of Morphological, Microscopical and cell wall Constituents of crude drugs.</p> <ul style="list-style-type: none"> ❑ Study of cell wall constituents and cell inclusions. ❑ Study of morphology and microscopy of different plant parts. <ul style="list-style-type: none"> i. Leaf; Datura, Senna ii. Bark: Cinnamon (Cassia), Cinchona iii. Root; Rauwolfia, Liquorice iv. Rhizome: Ginger, Podophyllum v. Flower: Clove 	05	02	

Sl. No	Topics/Lessons Pharmacognosy	Teaching/learning Hours		
		Lecture	Tutorial	Practical
3	<p><i>General study of the chemical classification of drugs with special reference to the followings:</i></p> <ul style="list-style-type: none"> ❑ Carbohydrate and related compounds: Dextrose, Fructose, Lactose. ❑ Glycosides: Aloes and Digitalis ❑ Tannins: Tannin ❑ Lipids: Olive oil, Castor oil, Shark liver oil, Coca butter, Wool fat, Bees wax ❑ Volatile oil: Oil eucalyptus ❑ Resins & resin compounds: Balsam tolu ❑ Alkaloids: Belladonna and opiums ❑ Vitamins and vitamin containing drugs: Vitamin A, B, C, D, E & K. ❑ Study of Natural Pesticides (Pyrethrum, Neem, tobacco) ❑ Study of plant constituents <ul style="list-style-type: none"> a) Brief study of various plant constituents. b) Biological source, method of production, Chemical constituents, tests, uses and adulterants of: <ul style="list-style-type: none"> i) Isapgol ii) Linseed iii) Honey iv) Acacia v) Agar vi) Tragacanth 	<p>04</p> <p>03</p> <p>03</p> <p>04</p> <p>04</p> <p>04</p> <p>03</p> <p>05</p> <p>05</p> <p>10</p>	<p>03</p> <p>02</p> <p>02</p> <p>03</p> <p>02</p> <p>02</p> <p>02</p> <p>02</p> <p>03</p> <p>03</p>	-
4	Study of plant fibres used in surgical dressing and related products.	06	03	
5	<p><i>Medicinal plants of Bangladesh:</i></p> <ul style="list-style-type: none"> ❑ A brief study including their collection, cultivation, harvesting, storage, constituents and uses of following plants <p>Tulsi, Bashoka, Neem, Thankuni, Pudina. Kalogeera, Methi.</p>	14	05	
6	<p>Practical:</p> <p>a. <i>Morphological examination of the following crude drugs:</i></p> <ul style="list-style-type: none"> ❑ Cinamon, Cardamon, Clove, Ginger, Datura, Rauowlfia & Belladonna, Senna, Nux Vomica and Ephedra. <p>b. <i>Microscopical examination and qualitative tests of the above drugs in the powdered form as far as practicable.</i></p>			<p>35</p> <p>35</p>
7	<p>Test for identification of /adulterants in:</p> <ul style="list-style-type: none"> a) Castor oil b) Shark Liver oil c) Wool fat d) Bees wax e) Sesame oil 			30
	Total =	100	50	100

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board
Marker
Microscope

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

3rd Year
Paper I: Subject- Pharmaceutics

Total hours: 250 hours

Lecture : 100 hours

Practical: 150 hours

Total marks : 200

Written : 100

Oral : 40

Practical : 40

Formative : 20

Objectives:

At the end of the course, the students will be able to:

- Prepare and compound of different preparations of drugs.
- Explain the dosage forms, dispensing and storage of medicines.
- Describe the principles of sterilisation and aseptic techniques.
- Sterilise the surgical accessories and dressings.

List of competencies (supplied)

Competencies related to Pharmaceutics to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding of

- Basic information about pharmaceutical Calculations.
- General Knowledge about P^H, buffers, isotonic Solutions, Solubility phenomena, Kinetics, Diffusion, Dissolution, Coarse dispersions, Emulsions, ophthalmic products.
- Various Dose & Dosage form of Drugs.
- Packaging of pharmaceuticals and relevant technology.
- Aseptic Techniques, sterilization, immunological products, incompatibilities of drugs.
- Routes of Drug administration.

B) Skill –

- Prepare and compound of different preparations of drugs.
- Explain to the patients/patients attendants about dosage forms, dispensing and storage of medicines.
 - Describe the principles of sterilization and aseptic techniques.
 - Sterilize the surgical accessories and dressings.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.

List of Competencies (me)

Ability to--

- prepare and compound of different preparations of drugs.
- Ability to explain the dosage forms, dispensing and storage of medicines.
- Ability to describe the principles of sterilisation and aseptic techniques.
- Ability to sterilize the surgical accessories and dressings.

Course contents:

Sl. No	Topics/Lessons	Teaching/Learning Hours		
		Lecture	Tutorial	Practical
01	A) Different Pharmaceutical preparation and dosage form: Define & Classify: <div><div><input type="checkbox"/> Tablet.</div><div><input type="checkbox"/> Capsules.</div><div><input type="checkbox"/> Creams.</div><div><input type="checkbox"/> Powders.</div><div><input type="checkbox"/> Ear Drops.</div><div><input type="checkbox"/> Emulsions.</div><div><input type="checkbox"/> Enemas.</div><div><input type="checkbox"/> Eye Drops.</div><div><input type="checkbox"/> Eye Lotions.</div><div><input type="checkbox"/> Gels.</div><div><input type="checkbox"/> Paste.</div><div><input type="checkbox"/> Pessaries.</div><div><input type="checkbox"/> Sprays.</div><div><input type="checkbox"/> Suspensions.</div><div><input type="checkbox"/> Tinctures.</div><div><input type="checkbox"/> Chewable Tablets.</div><div><input type="checkbox"/> Suppositories.</div><div><input type="checkbox"/> Syrups</div><div><input type="checkbox"/></div></div> <div><div><input type="checkbox"/> Effervescent.</div><div><input type="checkbox"/> Granules.</div><div><input type="checkbox"/> Implants.</div><div><input type="checkbox"/> Infusions.</div><div><input type="checkbox"/> Inhalations.</div><div><input type="checkbox"/> Injections. .</div><div><input type="checkbox"/> Jellies.</div><div><input type="checkbox"/> Linctuses.</div><div><input type="checkbox"/> Liniments.</div><div><input type="checkbox"/> Lotions.</div><div><input type="checkbox"/> Lozenges.</div><div><input type="checkbox"/> Mixtures.</div><div><input type="checkbox"/> Mouthwashes.</div><div><input type="checkbox"/> Nasal Drops.</div><div><input type="checkbox"/> Ointments.</div><div><input type="checkbox"/> Ophthalmic Ointments.</div><div><input type="checkbox"/> Solutions.</div><div><input type="checkbox"/> Dispersible Tablets.</div></div>	10	04	
	B) Novel Drugs Delivery System: Discuss briefly about <div><div><div><input type="checkbox"/> Nasal,</div><div><input type="checkbox"/> Ocular,</div><div><input type="checkbox"/> Buccal.</div><div><input type="checkbox"/> Transdermal,</div><div><input type="checkbox"/> A General knowledge of colour, flavour, preservatives & antioxidant</div></div><div><div><input type="checkbox"/> Per-oral,</div><div><input type="checkbox"/> Vaginal</div><div><input type="checkbox"/> Pulmonary,</div></div><div><div><input type="checkbox"/> Intramuscular drug delivery systems.</div></div></div>	03 <		

Sl. No	Topics/Lessons	Teaching/Learning Hours		
		Theory	Tutorial	Practical
03	Oral administration of solid dosage <ul style="list-style-type: none"> Tablets: <ul style="list-style-type: none"> Define Tablet and describe its merits and demerits. Mention different types of compressed tablets and their uses. Briefly introduce controlled release tablet, sustained release tablet and their examples. Mention formulation of tablets with examples. Mention process involved in the production of tablets (Direct compression, dry granulation and wet granulation). Evaluation of Tablets: Pharmacopoeial and non pharmacopoeial tests. Describe the defects in tablets. Describe the reasons for the tablets coating and types of tablet coating (Film coating, sugar coating and enteric coating) and their merits and demerits. Capsule: <ul style="list-style-type: none"> Define capsule and mention its types and advantages and disadvantages. Mention different sizes of Hard and soft gelatin capsule, filling materials in hard and soft gelatin capsule, and describe method for calculation of filling weight. Describe different part and filling procedure of hard gelatin capsule using manual filling machine. Mention the difference between hard & soft gelatin capsule. Describe the packaging and storage of capsule. 	05	03	
		05	04	
04	Biphasic pharmaceutical products <ul style="list-style-type: none"> Emulsion: <ul style="list-style-type: none"> Define emulsion and mention its types. Identification for emulsion. Define and classify emulsifying agents. Mention the components of formulation with examples and describe the method of preparation in brief. Instabilities in emulsions. Describe the storage condition for emulsion. 	05	03	
05	<ul style="list-style-type: none"> Suspension: <ul style="list-style-type: none"> Define suspension and mention the characteristics of an ideal suspension. Mention the formulation components with examples. Describe preparation in brief. Mention the difference between flocculated and deflocculated system. Describe packaging and storage condition. 	05	03	

Sl. No	Topics/Lessons	Teaching/Learning Hours		
		Theory	Tutorial	Practical
06	Semisolid dosage form: <ul style="list-style-type: none"> • Ointment: <ul style="list-style-type: none"> • Define ointment and mention the characteristics of an ideal ointment. • Classify ointments. • Classify ointment bases. • Describe packaging and storage condition. • Cream, Pest & Jellies: <ul style="list-style-type: none"> • Define Cream, Pest & Jellies. • Mention formulation components with examples. • Describe preparation, packaging and storage of each in brief. 	04	02	
07	Packing of pharmaceutical dosage form. <ul style="list-style-type: none"> • Define packaging, primary packaging, secondary packaging, container and closure. • Mention the ideal characteristics of containers and closures. • Classify containers on the basis of <ul style="list-style-type: none"> (a) Method of closure and use. (b) Shapes. • Mention types and merits and demerits of glass, plastics, metals and papers. • Describe the packaging guidelines for pharmaceuticals implemented in Bangladesh. 	12	04	
08	Aerosol. <ul style="list-style-type: none"> • Define aerosol and mention its merits and demerits. • Describe aerosol principle. • Illustrate components of aerosol. • Describe aerosol system operation. 'Describe metered dose inhalers (MDI) and Dry power inhaler (DPI). • Mention the advantages of Aerosol over other dosage forms. 	05	04	
09	Parental preparation <ul style="list-style-type: none"> • Introduce parenteral preparations, types of products and mention its different routes of administration with examples. • Mention its advantages and disadvantages. • Briefly introduce small volume and large volume parenteral. • Describe the steps involved in manufacturing of parenteral preparation in brief. • Describe the quality control test for parenteral products. (Sterility, Pyrogen, Particulate matter and leak test of ampoules.) 	12	05	
10	Powder: <ul style="list-style-type: none"> • Define and classify powders, mention its advantages and disadvantages. • Describe preparation of different types of powders encountered in prescriptions. • Describe its packaging and storage. 	05	03	

Sl. No	Topics/Lessons	Teaching/Learning Hours		
		Theory	Tutorial	Practical
11	Suppositories: <ul style="list-style-type: none"> Define suppositories and mention its types. Describe the packaging and storage. 	03	02	
12	Ophthalmic product: <ul style="list-style-type: none"> Introduce and classify ophthalmic products. Describe packaging and storage conditions. 	03	02	
13	Surgical product and medical appliances: <ul style="list-style-type: none"> Define surgical products and explain suture and ligature. Classify suture and ligature with examples. Orient with other medical appliances such as contract lens, urinary catheters, medical and surgical gloves, cottons, syringes, nebulizers, surgical gauzes, bandages, adhesive tape, protective cellulosic homeostasis etc. 	12	03	
14	Practical: <ol style="list-style-type: none"> A knowledge of apparatus and equipment used in pharmacy for compounding & dispensing of medicines. Preparation of percentage solution and Molar solution Preparation of ointments by slab and spatula method Preparation of Mixtures, Syrups, Elixirs, Emulsions, Suspensions, Powders, Medicated cream Capsule filling (manual) including hygroscopic substance 			20 20 20 20 20
	Total=	100	50	100

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board/ Marker
Black board/chalk

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper II: Subject- Pharmacology

Total hours: 250 hours
Lecture : 100 hours
Tutorial/Practical: 150 hours

Total marks : 200
Written: 100
Oral : 40
Practical : 40
Formative: 20

Objectives:

At the end of the course, the students will be able to:

- Describe the general principles of pharmacology.
- Define and classify different types of drugs.
- Explain the mode of action of different drugs.
- Describe the metabolism of drugs in the human body.
- Identify different groups of drug and explain their applications in clinical practice.
- Mention the toxic effects of drugs.

List of Competencies (me)

Ability to--

- describe the general principles of pharmacology.
- define and classify different types of drugs.
- explain the mode of action of different drugs.
- describe the metabolism of drugs in the human body.
- identify different groups of drug and explain their applications in clinical practice.
- mention toxic effects of drugs & Drug interactions
- use knowledge of route of administration, indications & contraindications of drugs

List of Competencies

Competencies related to Pharmacology to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding of

- Basic information about Sources and Active ingredients of drugs, routes of administration, absorption of drugs, Indications, Contraindications, Side effects of Drugs, Factors modifying drugs effects, Drug toxicity, Drug interactions.
- Basic information about Nervous System and Uses of drugs.
- Blood and Blood forming agents, Respiratory system and uses of drugs, Cardiovascular system and Use of drugs, Digestive system and Uses of drugs, Hormones and hormone antagonists, Histamines, antihistamines and prostaglandins.

B) Skill –

- Describe the general principles of pharmacology.
- Explain the mode of action of different drugs.
- Describe the metabolism of drugs in the human body.
- Identify different groups of drug and explain their applications in clinical practice.
- Mention the toxic effects of drugs.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.

Course contents:

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Lecture	Tutorial	Practical
1.	General Pharmacology: <ul style="list-style-type: none"> □ Introduction and definitions – Sources and active ingredients of drugs. □ Routes of administration of drugs. □ Absorption of drug and the factors affecting them. □ Drug distribution, Bio-transformation and Excretion □ Drug toxicity. □ Drug interactions: Basic concepts of Drug interactions. 	01 01 01 01 01 01	06	
2	General Pharmacological Principles: <ul style="list-style-type: none"> □ Introduction & Definition of Pharmacology. □ Pharmacokinetics: Definition, Process of absorption, distribution, biotransformation, Elimination, Factors affecting on these processes. □ Pharmacodynamics. □ Mechanism & principles of drug action. □ Half-life, plasma concentration of drug and bioavailability. □ Types of adverse drug reaction. 	01 01 01 01 01	04	
3	Pharmacology of Drugs acting on different systems	02		
i)	NSAIDs & Antipyretic Analgesics: <ul style="list-style-type: none"> □ Define Pain, Pyrexia and Inflammation. □ General Mechanism of action, Use, Side effect, Contraindication, Precaution and dose of commonly used of following drugs: Ibuprofen, Indomethacin, Diclofenac, Paracetamol, Aspirin. 			

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Theory	Tutorial	Practical
2.	<i>Pharmacology of Drugs acting on different systems</i>			
a)	i) Drugs Acting on Autonomic Nervous System: General mechanism of Action, use, Side Effect, indications , Contraindication, precaution and dose of commonly used of following drugs: <input type="checkbox"/> Cholinergic drugs: Pilocarpine, Neostigmine. <input type="checkbox"/> Anticholinergic drugs: Atropine, Dicyclomine. <input type="checkbox"/> Adrenergic drugs: Adrenaline, Noradrenaline, Dopamine. <input type="checkbox"/> Antiadrenergic drugs: Tamsulosin, Propranolol, Atenolol. ii) Drugs acting on central nervous system. <input type="checkbox"/> Classifications, General Pharmacological actions, mechanism of action, use, side effect, contraindication, precaution and dose of commonly used of following drugs: <ul style="list-style-type: none"> • General anesthetics. • Sedative, hypnotics. • Antiepileptic drugs. • Antiparkinsonian drugs. Antipsychotic, antianxiety, antimanic and antidepressant drugs.	02 02 02 02 02 02 02 02	02 02 01 01 01 01 01 01	
b)	Renal System (diuretics) and antidiuretics.	06	02	
c)	<i>Blood and Blood forming Agents</i> <input type="checkbox"/> Coagulants and anti-coagulants. <input type="checkbox"/> Haemopoietics. <input type="checkbox"/> Thrombolytics and antiplatelet agents.	02 02 02	02 02 01	

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Theory	Tutorial	Practical
d)	Respiratory System Drugs: <ul style="list-style-type: none"> <input type="checkbox"/> Define Cough, asthma, COPD <input type="checkbox"/> General mechanism of action, use, side effect, indications, contraindications, precaution and dose of commonly used drug <ul style="list-style-type: none"> • Drugs used in cough: Antitussives(Codeine, Dextromethorphan) • Expectorant:Ammonium Chloride, Bromohexine, Guafensin. • Drugs used in asthma and COPD: Bronchodilators: Salbutamol, salmeterol, Theophyllin, Aminophyllin. 	02 02 01 02	02 01 01 01	
e)	Cardiovascular drugs. <ul style="list-style-type: none"> <input type="checkbox"/> Description: Hypertension, Angina, congestive cardiac failure, Arrhythmia, Coagulation, Hyperlipidemia, Myocardial infraction. <input type="checkbox"/> Classifications, General mechanism of action, use, side effect, indications, contraindications, precaution and dose of commonly used: <ul style="list-style-type: none"> • Diuretics and anti-diuretics: • Beta Blockers: • Calcium Channel Blockers: • ACE inhibitors. • Anti-platelet, Anticoagulant. 	02 02 01 01 01 01 01	03	
f)	Digestive system <ul style="list-style-type: none"> <input type="checkbox"/> Antacids and drugs used in peptic ulcer <input type="checkbox"/> Purgatives and laxatives. <input type="checkbox"/> Antidiarrhoeals <input type="checkbox"/> Emetics and Antiemetics <input type="checkbox"/> Antispasmodics 	02	02	

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Theory	Tutorial	Practical
g)	Hormones and related drugs. <ul style="list-style-type: none"> □ Classifications, General Pharmacological actions, mechanism of action, use, side effect, indications, contraindications, precaution and dose of commonly used drugs • Drug used in hypothyroidism and hyperthyroidism. • Anti-diabetic drugs. • Glucagon. • Corticosteroids. • Gonadal hormones and their antagonist. • Oxytocin, ergometrin 	02	05	
h)	Miscellaneous: Histamines/Antihistamines/Prostaglandins	06	03	
3.	Antimicrobial Drugs: <ul style="list-style-type: none"> □ Classification of antimicrobials according to their mechanism of action, spectrum of activity, type of action, type of organism against which the antibiotics are active. □ General principles of antimicrobial therapy. □ Microbial resistance, mechanism and types. □ General mechanism of action, uses, side effects, indications, contraindication, precaution and dose of commonly used drug • Penicillin. • Cephalosporin. • Beta lactam inhibitors and their combination. • Tetracycline. • Macrolides. • Antifungal. • Antimalarial. • Antiprotozoal. • Anthelmintic. 	04		04

Sl. No	Topics/Lessons	Teaching/learning Hours		
		Theory	Tutorial	Practical
4.	Chemotherapy of Cancer Chemotherapy and antineoplastic drugs. <input type="checkbox"/> Mechanism of action, use, side effect, indications , contraindications, precaution and dose of commonly used anticancer drugs. Handling of anticancer drugs.	05	01	
	List of life saving and emergency drugs. <ul style="list-style-type: none"> • Drugs used in Anaphylactic shock. • Drugs used in myocardial infraction and cardiogenic shock. • Drugs used in peripheral circulatory collapse. • Medicines for Hypertensive Crisis. Anti-snake venom for snake bite.	05	01	
5	Practical			
	1. Measure the temperature/pulse rate/ respiration rate/blood pressure of human volunteers/Students. 2. Blood Grouping Test. 3. Test for pyrogen. 4. Test for anti-coagulants.			25
	Total =	100	50	100

Teaching Methods:

Lecture

Practical Demonstration

Media:

Multi media

OHP

White Board/Marker

Black board/chalk

Chemicals/reagents/instruments

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks

Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper III: Subject - General, Community & Hospital Pharmacy

Total hours: 250 hours

Lecture: 150 hours

Tutorial : 100 hours

Total marks: 200

Written : 100

Oral & Practical : 40+40

Formative: 20

Objectives:

At the end of the course, the students will be able to:

- Acquire general pharmaceutical knowledge such as weight & measure, pharmaceutical latin & posology
- Communicate with the patients, physicians, nurses, pharmacists and other staffs .
- Maintain stock register.
- Prepare annual reports and budget with drug storage.
- Compound and dispense different preparations according to prescription.
- Advise to the patient.
- Practice the rational use of drugs to the patients.
- Provide Primary Health Care as a pharmacist.

List of Competencies:

Ability to--

- show competence in general pharmaceutical knowledge such as weight & measure, pharmaceutical latin & posology
- Ability to communicate with the patients, physicians, nurses, pharmacists and other staffs.
- maintain stock register.
- prepare annual reports and budget with drug storage.
- compound and dispense different preparations according to prescription.
- advise & counsel the patient & attendants
- practice the rational use of drugs to the patients.
- provide Primary Health Care as a pharmacist.

List of Competencies:

Community pharmacy

Competencies related to Community Pharmacy to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding of

- Basic information about Establishment of Community Pharmacy, Pharmacy management and Trends of Community Pharmacy.
- Different parts of Prescriptions, Rules of receiving, dispensing, Checking, delivery and recording prescribing.
- Posology, Rules and methods of storage and preservation of pharmaceuticals with special reference to sera and vaccines, antibiotics, vitamins, hormones etc.
- General Knowledge about Store Management.
- Duties and Responsibilities of a pharmacist in a Community Pharmacy.

B) Skill –

- Communicate the patient about prescriptions.
- Maintain Stock register.
- Prepare annual reports and budget with drug storage.
- Compound and dispense different preparations according to prescription.
- Practice the rational use of drugs to the patients.
- Provide primary Health care as a pharmacist.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.
- Counseling to the patient about drugs abuse, drug addiction, and drug interaction, side effect of drugs, OTC Products and overall health education.

Hospital Pharmacy

Competencies related to Hospital pharmacy to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding

- Basic information about Weight & Measure, Pharmaceutical **latin**, Surface Active Agents.
- Different parts of Prescriptions, Rules of receiving, dispensing, Checking, delivery and recording, prescribing.
- Posology, Rules and methods of storage and preservation of pharmaceuticals with special reference to sera and vaccines, antibiotics, vitamins, hormones etc.
- General Knowledge about Store Management.
- Duties and Responsibilities of a pharmacist in a hospitals.

B) Skill –

- Communicate the patient, physicians, nurses, pharmacists and other staffs in a hospital.
- Maintain Stock register.
- Prepare annual reports and budget with drug storage.
- Compound and dispense different preparations according to prescription.
- Practice the rational use of drugs to the patients.
- Provide primary health care as a pharmacist.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.
- Counseling to the patient about drugs abuse, drug addiction, drug interaction, side effect of drugs and overall health education.

Course contents

Sl. No	Topics/Lessons	Teaching/learning hours	
		Lecture	Tutorial
1.	General Pharmacy:		
a)	<i>Pharmaceutical Latin:</i> A general knowledge of the Latin as used in the prescriptions for interpretation and translation	05	03
b)	Posology: A general knowledge of different factors for determining doses/ Calculation of children's doses from adult doses/ Detection of overdoses from prescriptions.	05	03
c)	Prescriptions and its various parts/ Rules of receiving, dispensing, checking, delivery and recording of prescriptions. Prescribed medication order and interpretation.	05	03
d)	A general knowledge of stability of drugs & importance of date expiry of drugs.	05	03
e)	Rules and methods of storage and preservation of pharmaceuticals with special reference to sera and vaccines, antibiotics, vitamins, hormones etc.	02	03

Sl. No	Topics/Lessons	Teaching/learning hours	
		Lecture	Tutorial
f)	Hospital Pharmacy: <input type="checkbox"/> Define Hospital and its function; classify hospitals based on various criteria, organization, management and delivery system in Bangladesh. <input type="checkbox"/> Define hospital pharmacy. <input type="checkbox"/> Explain Functions and objectives of hospital pharmacy services. <input type="checkbox"/> Explain requirements and abilities required for hospital pharmacists. <input type="checkbox"/> Duties & Responsibilities of a Hospital pharmacist. <input type="checkbox"/> Record keeping and preparation of the annual report of the hospital dispensing.	08	03
	Explain drugs distribution system in hospital with emphasis on: <input type="checkbox"/> Outpatient Services. <input type="checkbox"/> In-patient services. <input type="checkbox"/> Types of services. <input type="checkbox"/> Detailed discussion of unit dose system. <input type="checkbox"/> Floor/ward stock system. <input type="checkbox"/> Satellite pharmacy System. <input type="checkbox"/> Bedside pharmacy.	05	03
g)	Drug and Therapeutic Committee <input type="checkbox"/> Introduction to Drug and Therapeutic committees. <input type="checkbox"/> Goals, objectives, structure, principle and Functions of the DTS. <input type="checkbox"/> Hospital Formulary.	05	03
	General Concept on Surgical and Sterilization <input type="checkbox"/> Familiarize with surgical dressing like cotton, gauze, bandages and adhesive tapes, sutures, I.V Sets, Ryle's tubes, Catheters, Syringes. <input type="checkbox"/> Health Accessories. <input type="checkbox"/> Sterilization.	05	03
	Drug Storage Management <input type="checkbox"/> Demand Estimation for procurement of drug supplies. <input type="checkbox"/> Requirement for drugs storeroom and storage requirement of general drugs including vaccines and narcotic drugs. <input type="checkbox"/> Principle of drugs inventory management: ABC analysis, VED Analysis, FSN analysis, FIFO, FEFO. <input type="checkbox"/> Handling of cytotoxic drugs and radioisotopes.		
	Application of computers in Pharmacy <input type="checkbox"/> Explain application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital and retail pharmacy establishments.	05	03
	Drug information. <input type="checkbox"/> Explain sources of drug information. <input type="checkbox"/> Elaborate drug information services. <input type="checkbox"/> Drug information bulletin.	05	03

Sl. No	Topics/Lessons	Teaching/learning hours	
		Lecture	Tutorial
2.	Establishment, operation and regulations of model Pharmacy & Model Medicine Shop in Bangladesh.	30	30
3.	<i>Community Pharmacy</i>		
a)	<i>The Community Pharmacy:</i> Definition	10	07
b)	<i>Establishment of Community Pharmacy:</i> i) Organization ii) Site selection iii) Capital requirements iv) Cash v) Inventory vi) Fixtures and equipments vii) Total investment and sources of capital	18	10
c)	<i>Pharmacy Management:</i> i) The role of management ii) Money iii) Inventory iv) Facilities v) Rental agreements vi) Fixtures and equipments vii) Personnel viii) Risks: Types/ Methods of handling risks/ Insurance ix) Records: Legal records/ Patient's records/ Financial records	18	10
d)	Patient Counselling in Community Pharmacy including OTC Products.	10	06
e)	Drug Dependence and misuse in Bangladesh	04	01
	Total =	150	100

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board/Marker
Black board/chalk

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

4th Year
Paper I: Subject - Integrated Health Care

Total hours : 120hours
Lecture : 100 hours
Practical : 20 hours
Special Lab Attachment: 150

Total marks : 200
Written : 100
Oral :40
Practical : 40
Formative : 20

Objectives:

At the end of the course, the students will be able to:

- Enumerate the vaccines used in EPI.
- Identify and use the WHO recommended Essential Drugs for Primary level health care centres.
- Mention the contraceptive methods now used in Bangladesh.
- Provide First- Aid to patients when needed

List of Competencies:

Ability to

- Enumerate **& administer** the vaccines used in EPI.
- Ability to store Vaccine and others biological products.
- Ability to describe available brands of vaccine; their indications, Cautions, Contraindications, side-effects, Warning, Routes of administration and Dosages.
- Ability to Identify and use the WHO recommended Essential Drugs for Primary level health care centres.
- Ability to describe the contraceptive methods & their uses in Bangladesh.
- Ability to Provide First- Aid to patients when needed.

List of Competencies :

Competencies related to integrated health Care to be acquired by the Diploma Pharmacist-

A) Knowledge and Understanding of

- Basic information about Immunological Products and Vaccines, Antisera, Immunoglobulin and EPI.
- Proper Store management of Vaccine and others biological products.
- Formation and strength and available brands, indications, Cautions, Contraindications, side-effects, Warning, Routes of administration, Dosages of Various drugs.
- Concept of Family Planning and its objectives, Methods of Family planning.
- First Aid.

B) Skill –

- Enumerate the Vaccines used in EPI.
- Identify and use the WHO Recommended Essential Drugs for primary level health care Centers.
- Mention the contraceptive methods now used in Bangladesh.
- Provide First-Aid to patients when needed.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.
- Communicating with patients regarding EPI and Vaccine.

Course contents:

Sl. No	Topics/Lessons	Teach/learning hours	
		Lecture	Tutorial
1	<i>Immunological Products and Vaccines:</i>		
a.	<i>Immunological products and vaccines(Special emphasis on EPI vaccines):</i> <i>Vaccines included under EPI Programme:</i> □ DPT, Polio (Oral), BCG, Measles	07	01
b.	□ Pentavalent (DPT, Hepatitis-B, Haemophilus influenzae vaccine). □ PCV (Pneumococcal Conjugate Vaccine) □ BOPV (Bivalent Oral Polio Vaccine), IPV (Inactivated Polio Vaccine) Fractional. □ MR Vaccine. (Measles & Rubella Vaccine) □ TT (Tetanus Toxoid) Vaccine.	06	02
c.	<i>General information about immunological products & Vaccines:</i> □ Immunity/ Types of immunity/ Active and Passive immunity/ □ General information about types, side-effects and contra-indications of vaccines	06	01
d.	□ Storage and use of vaccines. <i>Vaccines and antisera:</i> □ BCG, Cholera, Diphtheria, German Measles, Hepatitis-B, Influenza, Measles, Mumps, Pertussis, Pneumococcal, Poliomyelitis, Rabies, Smallpox, Tetanus, Typhoid and Yellow Fever Vaccines <i>Immunoglobulin:</i> Normal gamma globulin/ Specific immunoglobulin (Anti HBs, Anti-rabies, Anti-tetanus), Anti-D (Rho) Immunoglobulin	06	02

Sl. No	Topics/Lessons	Teach/learning hours																											
		Lecture	Tutorial																										
2	Products recommended for Primary Level Health Care																												
i.	<p>Formation and strength and available brands/ Indications/ Cautions/ Contra-indications/ Side-effects/ Warning/ Routes of administration/ Dosages of the following drugs: Establishment of Community Pharmacy:</p> <table><tr><th>Name of chemical substances</th><th>Dosage forms</th></tr><tr><td>Albendazole; Ascorbid-Acid;</td><td>Tablet/Oral Suspension.</td></tr><tr><td rowspan="2">Aluminium Hydroxide, Magnesium Trisilicate / Magnesium Hydroxide</td><td>Tablet/ Oral suspension</td></tr><tr><td>Capsules/Powder for Oral suspension/Powder for Inj</td></tr><tr><td>Benzyl Benzoate</td><td>Application</td></tr><tr><td>Chloramphenicol</td><td>Capsule/ Powder for Oral susp/ Inj /eye & ear drop/cream</td></tr><tr><td>Ergometrine/ Methyl Ergometrine</td><td>Tablet/Injection</td></tr><tr><td>Ferrous Salt + Folic Acid</td><td>Capsule/Tab/Syrup.</td></tr><tr><td rowspan="2">Hyoscine Butyl Bromide/Tiemonium Methyl Sulphate.</td><td>Tablet/Injection</td></tr><tr><td>Tablet</td></tr><tr><td>Mebendazole</td><td>Tablet/ Oral suspension</td></tr><tr><td>Oral Rehydration Salt</td><td>Sachet for solution</td></tr><tr><td>Tetracycline</td><td>Capsule/ Powder for Inj/ Eye, ear & topical ointment</td></tr><tr><td>Ciprofloxacin</td><td>Tablet, Eye drop, Suspension.</td></tr></table>	Name of chemical substances	Dosage forms	Albendazole; Ascorbid-Acid;	Tablet/Oral Suspension.	Aluminium Hydroxide, Magnesium Trisilicate / Magnesium Hydroxide	Tablet/ Oral suspension	Capsules/Powder for Oral suspension/Powder for Inj	Benzyl Benzoate	Application	Chloramphenicol	Capsule/ Powder for Oral susp/ Inj /eye & ear drop/cream	Ergometrine/ Methyl Ergometrine	Tablet/Injection	Ferrous Salt + Folic Acid	Capsule/Tab/Syrup.	Hyoscine Butyl Bromide/Tiemonium Methyl Sulphate.	Tablet/Injection	Tablet	Mebendazole	Tablet/ Oral suspension	Oral Rehydration Salt	Sachet for solution	Tetracycline	Capsule/ Powder for Inj/ Eye, ear & topical ointment	Ciprofloxacin	Tablet, Eye drop, Suspension.	25	05
Name of chemical substances	Dosage forms																												
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<i>Vitamin</i>	<i>Tablet/Capsule/ Inj/ Syrup</i>																												

Sl. No	Topics/Lesson	Teaching/learning hours	
		Lecture	Tutorials
3	Family Planning		
A.	Concept of Family Planning and its Objectives: A general knowledge about different health and family planning activities of the government and non- government organisations (Directorate of Family Planning and Welfare, NGO's)	10	02
B.	Contraceptive Methods: General information about contraceptives/ Selection/ Caution/ Warning signs/ Risks/Side effects and complications/Technique/ Doses and uses of:	10	01
a)	Temporary Methods:		
i.	Safe Periods/ Abstinence etc	05	01
ii.	Barrier methods- Condoms/ Diaphragm/ Caps/ Mechanical (Intra-Uterine Device: Copper-T, Coils)		
iii.	Hormonal contraceptives: Oral Pill: Combination/ Low dose pill/ Progesterone only pill, male pill Depot forms: Injectable/ Norplant	05	01
	Permanent methods: Vasectomy (males) & Tubectomy (females)		
4.	First Aid: A comprehensive knowledge of First Aid treatment of: Haemorrhage, Fractures, Burns and scalds, Poisoning, Loss of consciousness, Convulsions, Asphyxia, Drowning, Snake and dog bites, Dressing of wounds and burns	20	05
Total =		100	20

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multimedia
OHP
White Board/Marker
Black board / chalk
Medicine strip/instrument/model

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Paper II: Subject – Regulatory Pharmacy & Ethics

Total hours : 100 hours
Lecture : 80 hours
Practical : 20 hours
Special Lab Attachment: 150

Total marks : 200
Written : 100
Oral & Practical : 80
Formative : 20

Objectives:

At the end of the course, the students will be able to:

- Describe the Drug Rules, Drug Acts (The Dangerous Drugs Act, 1930; The Poisonous Act 1919; Narcotic Act;) Pharmacy Ordinance and their implications on Pharmacy practice.
- Explain the role of a pharmacist in promoting Pharmacy profession.
- Describe the roles & responsibilities of pharmacists towards the society, physicians, patients, public and other allied professionals
- Describe Code of Conduct in Pharmacy & Pharmacists' Code of Ethics framed by Pharmacy Council of Bangladesh.
- Follow the Codes of Conducting, Dispensing, advertising of Drugs.

List of Competencies :

Ability to--

- describe the Drug Rules, Drug Acts, Pharmacy Ordinance and their implications on Pharmacy practice.
- explain the role of a pharmacist in promoting Pharmacy profession.
- describe Code of Conduct & ethics in Pharmacy.
- describe and follow National Drug policy of Bangladesh.
- play the expected roles & responsibilities of pharmacists towards the society, physicians, patients, public and other allied professionals
- follow the Codes of Conducting, Dispensing, advertising of Drugs.

List of Competencies

Competencies related to Forensic Pharmacy to be acquired by the graduates-

A) Knowledge and Understanding

- Knowledge of Various Act, Ordinance of drugs and Pharmacy Profession which are published in different periods.
- Pharmacists' Code of Ethics framed by Pharmacy Council of Bangladesh.
- Codes of Conducting, Dispensing, advertising of Drugs.
- Penalty of a Pharmacist misconducting to the profession.

B) Skill –

- Describing the Drugs Rules, Drugs Acts, Pharmacy Ordinance and their implications on Pharmacy Practice.
- Explain the role of a pharmacist in promoting Pharmacy Profession.
- Describe Code of Conduct in Pharmacy.

C) Attitude –

- Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.

Course contents

Sl. No	Topics/Lessons	Teach/learning hours	
		Lecture	Tutorial
1	The Drugs Act, 1940 and Drug Rules	08	02
2	The Dangerous Drugs Act, 1930	08	02
3	The Pharmacy Ordinance, 1976	08	02
4	The Poisonous Act 1919 and Poison Rules	08	02
5	Narcotic Act	06	02
6	The Insecticides Act.	06	02
7	Drug Control Ordinance, 1982 and such other Acts and Rules which materially affect pharmacy profession and dispensing of drugs	06	02
8	A general knowledge of the Pharmacy profession and its responsibilities towards the society. Pharmacists and their relation to physicians, patients, public and other allied professionals.	06	02
9	Pharmacists Code of Ethics framed by Pharmacy Council of Bangladesh.	06	01
10	Codes of Conducting/ Dispensing/ Advertising of Drugs	06	01
11	National Drug policy of Bangladesh.	06	01
12	Definition: law & Ethics. Deference between law & Ethics.	06	01
	Total =	80	20

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board/Marker
Black board / chalk

Assessment:

Written – SAQ= 80 marks, MCQ=20 marks
Practical or OSPE 40 marks, Oral/SOE-40 marks, Formative-20 marks

Outline of Institutional Academic Laboratory

Minimum Standard List of Laboratory-wise Equipment's/ Machineries Any Pharmacy Department Running a Diploma-in-Pharmacy Course Must Contain the Following Minimum Instruments in Their Laboratories:

(The laboratories and their instruments listed here are only a suggestive minimum. Any Institute may create more number of laboratories or include more instruments in their laboratories.)

1) Pharmaceutical Chemistry.	
I)	Analytical Balance
II)	Bunsen Burner and Gas
III)	Burette, Pipette and Glassware.
IV)	Clamp with Stand.
V)	Mortar and Pestle.
VI)	pH Meter.
VII)	Distill Water Plant for laboratory.
VIII)	Fume Hood.
IX)	Desiccators.
X)	Drying Oven
XI)	Top Loading Balance.

2) Pharmacognosy.	
I)	Analytical Balance
II)	Bunsen Burner and Gas
III)	Burette, Pipette and Glassware
IV)	Clamp with Stand
V)	Dryer
VI)	Fume Hood
VII)	Grinding Machine
VIII)	Heating Mantle
IX)	pH Meter
X)	Reflux Flask with Condenser
XI)	Water Bath
XII)	Water Distillation Plant

Outline of Special Lab Attachment

Objectives: At the end of the Field Training/Internship, the students will be able to:

1. Medicine Management.
2. Monitoring drug Charts.
3. Dispensing Drugs to the patients according to Prescription.
4. Patient counselling about drugs/medicine, health education.
5. Describe the functions, administration of Hospital Pharmacy.
6. Describe the role of a Pharmacist in hospital pharmacy.
7. Role of a Pharmacist towards the Community.
8. Create a relationship among doctors, nurses & patients for rational drug uses.
9. First Aids management for various emergencies.
10. Drug production process.
11. Quality Control Management Process.

List of Competencies

Competencies related to Field Training/Internship will be acquired by the graduates-

1. Knowledge and Understanding
 - Knowledge of various Prescription and prescription filling process.
 - Knowledge of storage system of various drugs.
 - Knowledge of Drugs dispensing system towards the patients.
2. Skill –
 - Hospital pharmacists can improve their skills through regular rotations. Hospital pharmacists operate in a different department within their hospital for a set amount of time, essentially.
3. Attitude –
 - Continuous self-learning to keep their knowledge & skill up to date through continuous professional development.

Field Training/Internship:

Duration	Institutions
07 Months (In Hospital)	Medical College Hospitals/General Hospitals/ District Hospitals. N.B: Do not allow field training/Internship less than District Hospitals.
01 Month (In Pharmaceutical Industries)	Pharmaceutical Industries. i. Production department ii. Packaging department iii. Quality Assurance Department iv. Quality control (QC) Department v. Microbiology Department of QC vi. Production development Department vii. Engineering Department viii. Factories administration

Job description of Medical Technologists (Diploma Pharmacist)

General Job

Medical Technologists (Diploma Pharmacist) has to:

A. Arrange a hospital pharmacy with the following to be taken into account:

1. Arrangement of medicine store:
 - ☐ Safety of the store.
 - ☐ Safety of the staff.
 - a) Dressing, use of gloves, mask, goggles whenever required.
 - b) Careful handling of chemicals and equipment.
 - c) Careful handling of open drugs if there is history of allergy.
 - ☐ Arrangement of furniture.
 - ☐ Arrangement of chemicals/drugs/MSR goods in specified place-
 - a) Adequate space between the items.
 - b) Poisonous drugs and narcotics to be kept in a separate almirah with proper labelling.
 - ☐ Labelling of drugs and chemicals-
 - a) Name of the drugs (generic name), nature of the drugs, poisonous drugs to be labelled with block letter in red ink.
 - b) Batch no Number and Expiry date of drugs.
 - ☐ Maintenance of records- stock ledger vouchers and indents.
 - ☐ Take care of pharmacy equipment and MSR goods.
 - ☐ Estimate the annual requirements and will maintain some essential statistical data.
2. Arrange a dispensing room with the following taken into account with the help of subordinate staff -
 - ☐ Safety of the dispensing room.
 - ☐ Cleaning of the dispensing room.
 - ☐ Proper set up of furniture.
 - ☐ Proper arrangements for dispensing.
 - ☐ Daily/ periodical reporting about types and quantity of drugs.

B. Commitment to the patients:

1. Should be well behaved to the patients and attendants & counselling about health education.
2. Proper advice to the patients/ attendants about drugs.
3. Provide first aid to the patients whenever and wherever required.
4. Responsible for inter-departmental co-ordination and co-operation.
5. Supervise the works of the junior colleagues.
6. Involve in the ongoing health programme i.e. Nutrition, PHC, FP, HE etc whenever necessary.
7. Help the audit team if required.
8. Perform any duties according to present job Standard level or above assigned by the higher authorities.

Special Job

1. Prepare the indent of medicine and MSR and will receive them from the CMS or DRS and will store them in the Medicine Store rooms.
2. Dispense medicine as per prescription of registered physician and dentist & other Registered Practitioners. They will not make any change to the prescription and will not supply any medicine outside the prescription.
3. Inform immediately to the prescribing physician or controlling officer about overdose or other anomalies in the prescription.

4. Diploma Pharmacist will take special care in the collection, storage, supply and distribution of poisonous and narcotic drugs. They will strictly follow the existing rules and regulations in this regard.
5. Advise the patient about the dose, duration and adverse effects of the medication during dispensing.
6. Inform the prescribing physician or concerned authority about reported adverse reactions and toxic effects of any drug in the prescription.
7. Prepare Mixture, Lotion and Ointment in the pharmacy if necessary.
8. Monitor regularly the physical form, date of expiry of different drugs and inform the authority before the date of expiry of any drug.
9. Keep day to day records of reception, distribution and stock position of different medicines and MSR and preserve the medicinal slip.
10. Take part in different activities of Primary Health Care and Essential Service Package (ESP) - especially EPI and health education. They will inform the people about the hazards of different life saving and common drugs.
11. Distribute medicine and MSR to the indoor, outdoor and emergency department from the medicine store as per approved indent.

At the Teaching Institutes:

At the Teaching Institutes the Medical Technologists (Pharmacy) personnel are positioned at three levels:

- a. Lecturers
 - b. Instructors
 - c. Technologists Pharmacist.
- a. **Lecturers:**
 - They shall perform small group teaching in tutorial, demonstration, and practical classes.
 - Facilitate practical demonstration and work of the students in the Physiotherapy pharmacy demonstration room as a ‘facilitator’ of practical ‘teaching group’.
 - Senior lecturers can perform large group teaching as well.
 - b. **Instructors:**
 - They will perform tutorial and demonstration classes relevant to practical items.
 - Ensure and guide the students to prepare practical note books.
 - Demonstrate elaborately procedures and methods of the practical works in the demonstration room and follow students’ performance in the practical classes.
 - Supervise practical classes as a ‘Team leader’.
 - Instructors can perform large group teaching as well.
 - c. **Technologists: Pharmacist:**
 - They shall perform practical in all practical classes.
 - Run practical demonstration and works for the students.
 - Perform small group demonstration relevant to practical.
 - Prepare Mixtures, Lotion and Ointments and maintain instruments, apparatus, glassware’s and other laboratory materials and logistics.
 - Responsible for laboratory set up and organisation including maintenance of registers, records and stock ledger under guidance of the supervisors.
 - Responsible for the security and safety of the demonstration room especially in respect to chemicals and reagents, fire, electric hazards and disposal of wastes.

Contents of Specific Job

Diploma Pharmacist will prepare indent of medicine and MSR and receive item from CMSD and DRS and store in the medicine room. Take special care in the collection, storage, supply and distribution of poisonous and narcotic drugs. They will strictly follow the existing rules and regulations regarding ethics.

- ❑ Collection of indent form/ book.
- ❑ Collection of demand list.
- ❑ Preparation of indent.
- ❑ Taking approval of the authority.
- ❑ Collection of medicine.
- ❑ Receiving medicine following standard procedure.
- ❑ Storage of medicine.
- ❑ Cleaning of the dispensing room with by the help of Subordinate Staff.
- ❑ Proper set up of furniture.

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5. Rajiv Gandhi University of Health Sciences, Karnataka. India.
6. Asian Institute Medical Science and Technology (AIMST), Malaysia.
7. Geomatika College of technology, Malaysia.
8. Certificate Course in Paramedical Subjects by Para Medical Education Board
Bangalore, India.
9. Senior Registered Nursing Curriculum by BNC