



Pharmacy Council of Bangladesh

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Dhaka – 1000

Curriculum For Diploma in Pharmacy Course

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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 3 years Diploma course in Pharmacy, 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 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.

Job description of Medical Technologists (Pharmacy)

General Job

Medical Technologists (Pharmacy) 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 equipments
 - 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 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 -
 - 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.
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 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 rooms.
2. Dispense medicine as per prescription of registered physician and dentist. 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. 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 Diploma Pharmacist personnel are positioned at three levels:

- a. Lecturers
- b. Instructors
- c. Technologists

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 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'.

c. ***Technologists:***

- 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, glasswares 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

Pharmacist will prepare indent of medicine and MSR and receive item from CMS 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
- Proper set up of furniture

COURSE DETAILS

A. **Course Title:** Diploma in Pharmacy

B. **Course philosophy and rationale**

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 of 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 & Biology.
- (ii) Candidate has to secure 2nd division or GPA 2.5 in the SSC examination. Candidate passed S.S.C. exam current year or previous three years or as decided by the authority for each year of admission.

2. **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 organised by the respective Institute of Health/ Medical Technology.

D. Course structure and duration

The course will be of three years duration. The total period is divided into 3 parts – 1st year, 2nd year and 3rd year. In each there will be 40 weeks (Teaching/Learning hours: 250- 1200 hours/year) of teaching and learning at the end of which there will be an year final examination. Supplementary examinations will be held 6 months of the year final examination.

| Year | Institutional teaching | Clinical placement | Revision & exam |
|----------|------------------------|--------------------|-----------------|
| 1st Year | 36 weeks | - | 04 weeks |
| 2nd Year | 36 weeks | - | 04 weeks |
| 3rd Year | 18 weeks | 18 weeks | 04 weeks |

E. Setting of the papers & distribution of teaching /learning hours year wise:

1st Year

| Papers | Subjects | Theory | Tutorial | Practical /Demon | Total |
|--------|-----------------------------------|--------|----------|------------------|-------|
| I | English | 75 | 25 | - | 100 |
| II | Physics | 70 | | 30 | 100 |
| III | Chemistry | 80 | | 20 | 100 |
| IV | Basic Human Anatomy | 70 | 60 | 70 | 200 |
| V | Basic Human Physiology | 75 | 60 | 65 | 200 |
| VI | Community Medicine | 150 | | 50 | 200 |
| VII | Basic Microbiology & Parasitology | 70 | | 30 | 100 |
| | Total | 590 | 145 | 265 | 1000 |

2nd Year

| Papers | Subjects | Theory | Practical/ Demonstration | Tutorial | Total Hours |
|--------|--------------------------|--------|--------------------------|----------|-------------|
| I | Pharmaceutical Chemistry | 210 | 75 | 60 | 345 |
| II | Pharmacognosy | 150 | 45 | 60 | 255 |
| III | Pharmaceutics | 151 | 75 | 34 | 260 |
| IV | Pharmacology | 125 | 75 | 62 | 262 |
| V | Basic Computer Science | 25 | 75 | | 100 |
| | Total | 661 | 345 | 216 | 1222 |

3rd Year

| Papers | Subjects | Theory | Tutorial | Field /Hospital placement | Total Hours |
|-----------|--|--------|----------|---------------------------|-------------|
| Paper I | General, Community and Hospital Pharmacy | 58 | 30 | | 88 |
| Paper II | Integrated Health Care | 83 | 19 | - | 102 |
| Paper III | Forensic Pharmacy | 60 | 20 | - | 80 |
| Paper IV | Field Training | | | 600 | |
| Total | | 201 | 69 | 600 | 270 |

F. Teaching & learning methods

The following teaching and learning methods will be followed:

1. Large Group Teaching Lecture aided by –
 - 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
4. Field Placement-
 - In small groups for performing activities by the student themselves

G. Assessment methods, grading and pass marks

Assessment Methods:

- A. There will be in-course (card/ item) and end-course (terminal) assessment for the students in each part (1st, 2nd & 3rd year) of the course i.e. formative and year final examination.
- B. There will be year final examinations at the end of each academic years and one supplementary examination 6 months after each regular year-final examination.
- C. Formative assessment will be done through items and card ending exam.
- D. In the year-final examination marks allocation will be as follows:
 - 20% from the formative examinations (Card final examination/Item marks).
 - 80% from year-final examination
- E. 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 written, practical, oral & formative examinations.
 - No objection Certificate from the head of the respective heads 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 Final examinations unless the student passes in all the subjects of 1st and 2nd year Final examinations respectively.

Grading

1. Grade A+ : 75% and above

2. Grade A: 60% - 74%

3. Grade B: 55% - 59%

Pass Marks/Grade-C

Written Exam - 50%

Practical - 50%

Oral - 50%

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

H. Examinations & distribution of marks

First Year Examinations

| Paper | Subjects | Written Exam | Oral Exam | Practical Exam | Formative Exam | Total Marks |
|-------|-----------------------------------|--------------|-----------|----------------|----------------|-------------|
| I | English | 100 | - | - | - | 100 |
| II | Physics | 75 | 10 | 15 | - | 100 |
| III | Chemistry | 75 | 10 | 15 | - | 100 |
| IV | Basic Human Anatomy | 100 | 40 | 40 | 20 | 200 |
| V | Basic Human Physiology | 100 | 40 | 40 | 20 | 200 |
| VI | Community Medicine | 100 | 40 | 40 | 20 | 200 |
| VII | Basic Microbiology & Parasitology | 100 | 40 | 40 | 20 | 200 |
| | TOTAL | 650 | 180 | 190 | 80 | 1100 |

Second Year Examinations

| Paper | Subjects | Written Exam | Oral Exam | Practical Exam | Formative Exam | Total Marks |
|-------|--------------------------|--------------|-----------|----------------|----------------|-------------|
| I | Pharmaceutical Chemistry | 100 | 40 | 40 | 20 | 200 |
| II | Pharmacognosy | 100 | 40 | 40 | 20 | 200 |
| III | Pharmaceutics | 100 | 40 | 40 | 20 | 200 |
| IV | Pharmacology | 100 | 40 | 40 | 20 | 200 |
| V | Basic Computer Science | 50 | - | 40 | 10 | 100 |
| | Total | 450 | 160 | 200 | 90 | 900 |

Third Year Examinations

| Paper | Subjects | Written Exam | Oral Exam | Formative Exam | Field Placement | Total Marks |
|-------|--|--------------|-----------|----------------|-----------------|-------------|
| I | General, Community and Hospital Pharmacy | 100 | 80 | 20 | | 200 |
| II | Integrated Health Care | 100 | 80 | 20 | | 200 |
| III | Forensic Pharmacy | 75 | 25 | | | 100 |
| IV | Field Training | | 50 | | 50 | 100 |
| | TOTAL | 275 | 235 | 40 | 50 | 600 |

Paper I: Subject - English

Total hours: 100 hour
Lecture: 75 hour
Practical / Tutorial: 25 hours

Total marks-50+50
Written-50+25
Oral - 25

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

1. Acquainted with the prose and poetry of HSC level written by famous writers
2. Read & write any story in English and attain HSC level English proficiency
3. Write letters in English (private, Official etc).
4. Translate & retranslate in English
5. Read and write essays on different topics in English
6. Develops listening skills in English
7. Communicate with each other in English

Subject : English (Part -I)

Marks = 50

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|--|-------------------------|-----------|
| | | Theory | Practical |
| 1. | <p>Text book: English for Today-Published by N.C.T.B. (Intermediate) Unit- Three: Learning English. 1. Learning a language 2. Why learn English 3. How to learn English 4. Different learners, different ways 5. Dealing with grammar 6. Integrated skills development 7. How well do I know my dictionary? Unit-Six: Our Environment. 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. Unit-Twenty-four: People, People Everywhere 1. What's the problem? 2. Kalim Majhee's boat. 3. The rootless. 4. Why is there discrimination? 5-7. The Revenge.</p> | 16 | |

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|---|-------------------------|-----------|
| | | Theory | Practical |
| 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 : | 22 | |
| | Paragraph writing : Letter writing: Application writing: Report writing : | 10 | |
| | Telegrams & E-mail: | 2 | |
| | Total | 50 | |

A. *Subject : English (Part -II)*

Marks = 25+25

| Sl. No | <u>Topics/Lessons</u> | Teaching/learning Hours | |
|--------|---|-------------------------|-------------------|
| | | Theory | Practical |
| | Communicative English : <ul style="list-style-type: none"> ▪ Reading skill ▪ Writing skill ▪ Listening skill ▪ Conversations skill | 4 4 4 4 | 8 8 8 10 |
| | Total | 16 | 34 |

Teaching Methods:

Lecture
Practical/ Tutorial/Communication

Media:

Multi media,
Laptop,
OHP,
White Board,
Marker,
Wall chart
VCD, DVD, CD

Assessment:

Written - SAQ (50% + 25%)
Reading, Listening & conversation 25%

Paper II : Subject - Physics

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

1. Define Physics and state the importance of Physics in the Health Care System.
2. Explain the different systems of measurement and weights.
3. Demonstrate basic knowledge on measurement of density and specific gravity of a substance.
4. Demonstrate basic knowledge on fundamental aspects of heat and temperature, sound, light, electricity and magnetism.

Course contents of পদার্থ বিজ্ঞান (Physics)

| Sl.No | Topic/Lessons তথ্যীয় | Teaching/Learning Hours | |
|-------|--|-------------------------|-----------|
| | | Theory | Practical |
| ১। | বলবিদ্যা ও পদার্থের ধর্ম : <ul style="list-style-type: none"> ➤ সরল রেখার গতি, গতির সমীকরণ, নিউটনের গতির সূত্র ত্বরণ ও বল, ঋত বল, ভেকটর ও সেলের রাশি। ➤ কৌণিক গতি, কৌণিক বেগ ও ত্বরণ বৃত্তাকার পথে গতি, কেন্দ্রভিগ বল। ➤ কাজ, ক্ষমতা ও শক্তি, শক্তির সংরক্ষণনীতি। ➤ সরল দোল গতি, সরল দোলক ➤ আর্কিমিডিসের সূত্র ও তার প্রয়োগ আপেক্ষিক গুরুত্ব নির্ণয়। | ১৫ ঘন্টা | |
| ২। | তাপ : তাপমিতি, তাপের একক, আপেক্ষিক তাপ, তাপীয় ক্ষমতা পানিসমও সুত্তাপ এবং ইহাদের নির্ণয় পদ্ধতিঃ সরলীয় পদ্ধতিতে তাপের পরিবাহিতা নির্ণয়। | ৭ ঘন্টা | |
| ৩। | শব্দ : <ul style="list-style-type: none"> ➤ 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। | ৭ ঘন্টা | |
| ৪। | আলোক : <ul style="list-style-type: none"> ➤ 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। | ৯ ঘন্টা | |
| ৫। | চুম্বক : <ul style="list-style-type: none"> ➤ চুম্বকের বিভিন্ন পদ্ধতিঃ চুম্বকের মতবাদ চুম্বকের ক্ষেত্র ও প্রবাল্য। বিপরীত বর্গীয় সূত্র প্রান্তমুখী ও প্রস্থমুখী অবস্থানে চুম্বকের প্রাবল্য। বিক্রেপী চুম্বকমান যন্ত্র ও ইহার ব্যবহার। ➤ চুম্বকত্ব। | ৭ ঘন্টা | |

| Sl.No | Topic/Lessons | Teaching/Learning Hours | |
|-------|---|-------------------------|---|
| | | Theory | Practical |
| ৬। | <p>তড়িৎ :</p> <ul style="list-style-type: none"> ➤ স্থির তড়িৎ, 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, বিভিন্ন 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। | ২৫ ঘন্টা | |
| | ব্যবহারিক | | |
| | <p>১। পাইড ক্যালিপার্স, স্ক্রুজ ও স্পেরোমিটারের ব্যবহার শিক্ষা।</p> <p>২। পানি অপেক্ষা হালকা/ভারি তরল ও কঠিন পদার্থের হাইড্রো-স্টেটিক ব্যালেন্স, নিকলসন হাইড্রোমিটার ও আঃ হাইড্রো বোতলের সাহায্যে আপেক্ষিক গুরুত্ব নির্ণয়।</p> <p>৩। সরল দোলকের সাহায্যে জি এর মান নির্ণয়।</p> <p>৪। একটি ক্যালরিমিটারের সাহায্যে পানিসম নির্ণয়।</p> <p>৫। কঠিন ও তরলের আপেক্ষিক তাপ নির্ণয়।</p> <p>৬। অবতল দর্পনের ফোকাস দূরত্ব নির্ণয়।</p> <p>৭। প্যারালাক্স পদ্ধতি উত্তল লেন্স ফোকাস দূরত্ব নির্ণয়।</p> <p>৮। একখানা কাচ ফলকের প্রতিসরাংক নির্ণয়।</p> <p>৯। ওহমের সূত্রের সত্যতা নির্ণয়।</p> <p>১০। যে কোন দৈর্ঘ্যের তারে আপেক্ষিক রোধ নির্ণয়।</p> <p>১১। নাল পদ্ধতিতে দুইখানা দণ্ড চুম্বকের চৌম্বক ডামকের তুলনা।</p> | | <p>৩ ঘন্টা</p> <p>৪ ঘন্টা</p> <p>৩ ঘন্টা</p> <p>২ ঘন্টা</p> <p>২ ঘন্টা</p> <p>২ ঘন্টা</p> <p>২ ঘন্টা</p> <p>৩ ঘন্টা</p> <p>৩ ঘন্টা</p> <p>৩ ঘন্টা</p> |
| | মোট : ১০০ ঘন্টা | ৭০ | ৩০ |

মান বন্টন : তৃতীয় = ৭৫

১। পদার্থের সাধারণ ধর্ম, আলোক ও তড়িৎ : প্রতিটি শাখা থেকে ১০ নম্বরের দুটি ও ৫ নম্বরের ২টি করে মোট (৬টি + ৬টি) = ১২টি প্রশ্ন থাকবে।
তন্মধ্যে ১০ নম্বরের ১টি করে ৩ শাখায় ৩টি ও ৫ নম্বরের ১টি করে ৩ শাখায় ৩ টি অর্থাৎ মোট ৬টি প্রশ্নের উত্তর দিতে হবে।

$$১০ \times ১ \times ৩ = ৩০$$

$$৫ \times ১ \times ৩ = ১৫$$

২। শব্দ ও তাপ ও চুম্বকত্ব : প্রতিটি শাখা থেকে ৫ নম্বরের ৪টি করে মোট ১২টি প্রশ্ন থাকবে। সেগুলোর মধ্যে থেকে ২টি করে মোট ৬টি প্রশ্নের উত্তর দিতে হবে।

$$৫ \times ২ \times ৩ = ৩০$$

দ্রষ্টব্য : 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

মৌখিক = ১০

মোট : তৃতীয়+ব্যবহারিক+মৌখিক = ১০০

Paper III : Subject - Chemistry

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

1. Describe fundamentals in physical chemistry.
2. Describe common laboratory process.
3. Identify organic and inorganic chemical compounds.
4. Explain the different aspects of metals, non-metal and gaseous substances.

Course contents of রসায়ন বিজ্ঞান (Chemistry)

| Sl.No | Topic/Lessons | Teaching/Learning Hours | |
|-------|--|----------------------------|-----------|
| | | Theory | Practical |
| | গ্রন্থপ-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। | ৬ ঘন্টা | |
| ৩। | সাধারণ পরীক্ষাগার প্রণালীঃ দ্রবণ, অতিদ্রবণ, পরিস্রাবণ, সম্পৃক্ত, অসম্পৃক্ত, ও অতিপৃক্ত দ্রবণ, দ্রাব্যতা, বাষ্পীভবন, পাতন, আংশিক পাতন, উর্ধ্বপাতন, কেলসন। | ৫ ঘন্টা 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-রাসায়িক ক্রিয়া, রাসায়নিক বিক্রিয়া ঘটানোর উপায় সমূহ। | ৪ ঘন্টা | |
| ৬। | অক্স, ক্ষারক ও লবন। | ২ ঘন্টা | |
| ৭। | গ্যাসের ধর্ম-বয়েলের সূত্র, চার্লসের সূত্র। | ২ ঘন্টা | |
| ৮। | মৌলের রাসায়নিক তুল্যাংক বা যোজন ভার। | ২ ঘন্টা | |
| ৯। | পরমাণুর গঠন এবং যোজ্যতার ইলেকট্রনীয় মতবাদ। | ৪ ঘন্টা | |
| | বিভিন্ন রাসায়নিক বন্ধন। | ২ ঘন্টা | |
| ১০। | ক) এডেগ্যাড্রে সূত্র খ) ভরক্রিয়া সূত্র। | ৬ ঘন্টা | |
| ১১। | রাসায়নিক সংযোগ বিধিঃ | | |
| | ক) ভরের নিত্যতা সূত্র। | খ) নির্দিষ্ট অনুপাত সূত্র। | |
| | গ) গুণানুপাত বিধি। | ঘ) বিপরীত অনুপাত সূত্র। | |
| | ঙ) গ্যাস আয়তন সূত্র। | | |
| | গ্রন্থপ-খ অধাতুঃ | | |
| ১। | নিম্নোক্ত পদার্থ গুলোর উৎস, প্রস্তুতি, ধর্ম এবং ব্যবহারঃ | ১০ ঘন্টা | |
| ক) | অক্সিজেন, ওজোন, পানি ও হাইড্রোজেন পার অক্সাইড। | | |
| খ) | হোলাজেন সমূহঃ ক্লোরিন, রোমিন, আয়োডিন ও হাইড্রো ক্লোরিক এসিড। | | |
| গ) | নাইট্রোজেন, হাইড্রোজেন সালফাইট, সালফার ডাইঅক্সাইড, সালফিউরিক এসিড। | | |
| ঘ) | সালফার, হাইড্রোজেন সালফাইট, সালফার ডাইঅক্সাইড, সালফিউরিক এসিড। | ৮ ঘন্টা | |
| 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, বিটিং পাউডার। | ১ ঘন্টা | |
| ৩। | কপার -কপার অক্সাইড, কপার সালফেট, কপার ফ্লোরাইড | ১ ঘন্টা | |
| ৪। | জিংক - জিংক অক্সাইড, জিংক ফ্লোরাইড, জিংক সালফেট। | | |

| Sl.No | Topic/Lessons | Teaching/Learning Hours | |
|-------------------------------|---|-------------------------|-----------|
| | | Theory | Practical |
| ৫। | এলুমিনিয়াম - এলুমিনিয়াম ফ্লোরাইড, এলুমিনিয়াম সালফেট। | ১ ঘন্টা | |
| ৬। | আয়রন - আয়রন সালফেট। | ১ ঘন্টা | |
| ৭। | লেড - লেড অক্সাইড। | ১ ঘন্টা | |
| ৮। | সিলভার - সিলভার নাইট্রেট। | ১ ঘন্টা | |
| গ্রন্থপ - প জৈব রসায়ন | | | |
| ১। | জৈব রসায়নের সংজ্ঞা, জৈব ও অজৈব যৌগের মধ্যে পার্থক্য জৈব যৌগের গঠন, শ্রেণী বিভাগ, কার্যকরী বা ডিনামিশীল মূলক। | ৪ ঘন্টা | |
| ২। | জৈব যৌগের নিষ্কাশন ও বিশুদ্ধকরণ | ১ ঘন্টা | |
| ৩। | সম্পৃক্ত ও অসম্পৃক্ত হাইড্রোকার্বনঃ প্রস্তুত প্রণালী, ধর্ম এবং ব্যবহার -মিথেন, ইথেন, ইথিলিন, এসিটাইলিন। | ২ ঘন্টা | |
| ৪। | এলকোহল হ্যালোজেন জাতকঃ মিথাইল ফ্লোরাইড, ক্লোরোফর্ম এর প্রস্তুতি, ধর্ম ও ব্যবহার। | ৪ ঘন্টা | |
| ৫। | এলকোহলঃ শ্রেণী বিভাগ, মিথাইল এলকোহল, ইথানল এলকোহল ও গিসারিনের প্রস্তুতি, ধর্ম ও ব্যবহার। | ২ ঘন্টা | |
| ৬। | ডাই-ইথাইল ইথারঃ প্রস্তুতি, ধর্ম ও ব্যবহার। | ১ ঘন্টা | |
| ৭। | এলডিহাইড ও কিটোল সমূহঃ নিম্নলিখিত যৌগসমূহের প্রস্তুতি, ধর্ম ও ব্যবহার, ফরমালডিহাইড, এসিটালডিহাইড ও এসিটোন। | ৩ ঘন্টা | |
| ৮। | কার্বনিক এসিডঃ এসেটিক এসিড ও সাইট্রিক এসিডের প্রস্তুতি, ধর্ম ও ব্যবহার। | ৩ ঘন্টা | |
| ৯। | এলকোহল এ্যামাইনঃ এ্যামাইনের শ্রেণী বিভাগ, মিথাইল এ্যামাইন ও ইথাইল এ্যামাইনের প্রস্তুতি, ধর্ম ও ব্যবহার। | ২ ঘন্টা | |
| ১০। | এ্যারোমেটিক যৌগঃ নিম্নলিখিত যৌগসমূহের প্রস্তুতি, ধর্ম ও ব্যবহার। বেনজিন, টলুইন, ফ্লোরোবেজিন নাইট্রোবেজিন, অ্যানিলিন, কার্বলিক এসিড, বেনজালডিহাইড, বেনজোয়িক এসিড ও স্যালিসাইলিক এসিড। | ৫ ঘন্টা | |
| ব্যবহারিক : | | | |
| ১। | অম্ল ও ক্ষারের মাত্রা নির্ণয়। | | ২০ ঘন্টা |
| ২। | হাইড্রোজেন ও অক্সিজেনের প্রস্তুতি। | | |
| ৩। | সহজ জৈব ও অজৈব যৌগের আঙ্গিক বিশেষণ। | | |
| মোট : ১০০ ঘন্টা | | ৮০ ঘন্টা | ২০ ঘন্টা |

মান বন্টন : তত্ত্বীয় - ৭৫
 ব্যবহারিক - ১৫
 মৌখিক - ১০

গ্রন্থপ - ক - ২৫ নম্বর
 গ্রন্থপ - খ - ২৫ নম্বর
 গ্রন্থপ - গ - ২৫ নম্বর

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

Paper IV: Basic Human Anatomy

Total hours: 200 hour
Lecture: 70 hou)
Practical: 70 hours
Tutorial : 60 hours

Total marks-200
Written-100
Oral & practical- 80
Formative- 20

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

1. Demonstrate a comprehensive knowledge base above the major anatomical system and structure of human body
2. Identify major anatomical system and structure of human body
3. Identify the specific structures and organs and application of such knowledge in studying their individual disciplines.
4. Do surface marking of important organ of human body.

Subject : Basic Human Anatomy

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|---|-------------------------|----------|-----------------------------|
| | | Theory | 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 | 10 |
| 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 | | |
|--------|--|-------------------------|----------|-----------------------------|
| | | Theory | 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, oesophagus, 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 ▪ Autonomic nervous system and short description of sense organs-eye, ear, nose, tongue and skin ▪ Important endocrine glands | 12 | 12 | 10 |
| 8. | Lymphatic System : <ul style="list-style-type: none"> ▪ Anatomy of lymph nodes and vessels | 2 | 2 | |
| * | Practical/ Demonstration: Practical and Demonstration to be designed according to the theoretical course contents. | | | |
| | Total = | 70 | 60 | 70 |

Teaching Methods:

Lecture
Tutorial
Practical/ Demonstration

Media:

Multi media,
Laptop,
OHP,
White Board,
Marker,
Skeleton
Wall chart

Assessment:

Written - SAQ (50%)
Practical (20%), Oral (20%), formative (10%)

Paper V: Basic Human Physiology

Total hours: 200 hour
Lecture: 75 hour
Practical: 65 hours
Tutorial : 60 hours

Total marks-200
Written-100
Oral & practical- 80
Formative- 20

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

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

Subject : Basic Human Physiology

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|--|-------------------------|----------|-----------------------------|
| | | Theory | 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 | 06 |
| | 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 | 10 |
| | 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 | | |
|--------|---|-------------------------|----------|-----------------------------|
| | | Theory | Tutorial | Practical/ Demonstration |
| | Respiratory system : <ul style="list-style-type: none"> ▪ Functions of respiratory system ▪ Mechanism of breathing | 05 | 05 | 10 |
| | 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 : anaemia, iodine deficiency, vitamin deficiencies ▪ Functions of liver, pancreas and gall bladder ▪ Composition & functions of different digestive juices & bile | 10 | 10 | 10 |
| | 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 |
| | 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 |
| | 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 | |
| | Lymphatic System : <ul style="list-style-type: none"> ▪ Composition & functions of lymph nodes and vessels | 03 | | |
| * | Practical/ Demonstration: Practical and Demonstration to be designed according to the theoretical course contents. | | | |
| | Total = | 75 | 60 | 65 |

Teaching Methods:

Lecture
Tutorial
Practical/ Demonstration

Media:

Multi media, Laptop, OHP, White Board, Marker, Wall chart
Lab. Reagent & Apparatus

Assessment:

Written - SAQ (50%)
Practical (20%), Oral (20%), formative (10%)

Paper VI: Community Medicine

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

Total marks-200
Written-100
Oral & practical- 80
Formative- 20

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

1. Describe the general aspects of community medicine
2. Describe the basic concepts of epidemiology
3. Describe the concept of primary health care
4. Define organisations of health services and major health programmes in Bangladesh
5. Carry on elementary bio-statistics
6. Enumerate the concept of demography and family planning
7. Define maternal and child health (MCH), describe its objectives and explain the importance of ante-natal and post-natal care for mother and children
8. Define food and nutrition and be aware of nutritional problems in Bangladesh
9. Be aware of occupational health hazards and their preventive and protective measures
10. Describe the principles of health education and their application in the community
11. Be aware of environmental pollution and methods of prevention and control of pollution
12. Enumerate the basic concept of Essential Service Package (ESP)

Subject : Community Medicine

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|--|-------------------------|-----------------------------|
| | | Theory | Practical/ Demonstration |
| 1. | Introductory community medicine: <ul style="list-style-type: none"> ▪ Definition of Community Medicine ▪ Concept of health : Definition / Dimensions / 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/Isolation/Quarantine etc. ▪ Major health programmes in Bangladesh ▪ Medical Information system (MIS) | 12 | 06 |

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|--|-------------------------|-----------------------------|
| | | Theory | Practical/ Demonstration |
| 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 |
| 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/Indication/Contra indication/ 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/function/daily requirements and deficiency of protein, fat, carbohydrate, vitamins and mineral ▪ 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 Anaemia/ Lathyrism | 15 | 06 |
| 9. | Occupational Health : <ul style="list-style-type: none"> ▪ Occupational health : Definition /Objectives ▪ Occupational Hazards: Introduction /Types ▪ Occupational disease: 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 of ▪ Communication Skills: Definition/Key elements /Barriers ▪ Behavioural Science : Introduction & concept ▪ Ethics: Introduction and concept | 12 | 04 |

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|--|-------------------------|-----------------------------|
| | | Theory | Practical/ Demonstration |
| 11. | Environment and sanitation: <ul style="list-style-type: none"> ▪ Definition of pollution, environment, 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 impratnce/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 |
| 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 |
| * | Practical/ Demonstration: Practical and Demonstration to be designed according to the theoretical course contents. | | |
| | Total= | 150 | 50 |

Teaching Methods:

Lecture
 Tutorial
 Practical/ Demonstration

Media:

Multi media
 Laptop
 OHP
 White Board
 Marker
 Wall chart, Models & Samples

Assessment:

Written - SAQ (50%)
 Practical (20%), Oral (20%), formative (10%)

Paper VII: Basic Microbiology & Parasitology

Total hours: 100hour
Lecture: 70 hour
Practical : 30 hours

Total marks-200
Written-100
Oral & practical- 80
Formative- 20

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

1. Demonstrate basic knowledge about general aspects of different micro organisms including classification and general characteristics of protozoa, bacteria, virus & fungus
2. Perform common methods of identification of different micro organisms particularly bacteria & fungus of medical importance
3. Perform the technique of cleaning, disinfections, decontamination & sterilization in neutron to destruction of micro organisms in laboratory practices.

Subject : Basic Microbiology & Parasitology

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|---|-------------------------|-----------------------------|
| | | Theory | Practical/ Demonstration |
| 1. | Introduction to micro organisms : <ul style="list-style-type: none"> ▪ Definition and classification of micro organisms ▪ Microbiological terminology ▪ Characteristics of Eukaryotic prokaryotic & sub cellular groups of micro organisms ▪ Microbiological articles, equipment's apparatus ▪ Microscope: Different parts of microscope, & maintenance of microscope | 06 | 08 |
| 2. | Destruction of micro organism : <ul style="list-style-type: none"> ▪ Cleaning, Washing, decontamination disinfection & procedures ▪ Sterilization of different laboratory articles, instruments, glass wares etc. | 03 | 04 |
| 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 & Pathogenecity ▪ Staining bacteria: Gram's staining, AFB staining, Albert staining | 15 | 12 |

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|---|-------------------------|-----------------------------|
| | | Theory | Practical/ Demonstration |
| 4. | 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 | 03 | 04 |
| 5. | 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 | 03 | 04 |
| 6. | Parasite : <ul style="list-style-type: none"> ▪ Definition /Classification of parasite | 01 | 02 |
| 7. | Helminth: <ul style="list-style-type: none"> ▪ General characteristics of helminths ▪ Classification /Morphology of helminths | 03 | 04 |
| 8. | Protozoa : <ul style="list-style-type: none"> ▪ General characteristics of protozoa ▪ Definition /Classification of protozoa | 01 | 02 |
| * | Practical/ Demonstration: Practical and Demonstration to be designed according to the theoretical course contents. | | |
| | Total = | 60 | 40 |

Teaching Methods:

Lecture
Tutorial
Practical/ Demonstration

Media:

Multi media,
Laptop/Computer,
OHP,
White Board,
Marker,
Wall chart
Models & Samples

Assessment:

Written - SAQ (50%)
Practical (20%), Oral (20%), formative (10%)

2nd Year

Paper I: Subject- Pharmaceutical Chemistry

Total hours: 345 hours

Lecture : 210 hours

Practical : 75 hours

Tutorial : 60 hours

Total marks - 200

Written - 100

Oral & Practical 40+40 = 80

Formative - 20

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

1. Describe the chemical and physical properties of substances used in medicine.
2. Explain the techniques of quality control of drugs

Course contents:

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|---|-------------------------|----------|-----------|
| | | Theory | Tutorial | Practical |
| 1 | <i>An introduction to Pharmaceutical Chemistry:</i> □ Definition, Branches and Scope | 08 | 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) | 10 | 02 | - |
| 3 | Inorganic Pharmaceutical Chemistry | 75 | 30 | |
| | General discussion on the following inorganic compounds including important physical and chemical properties, medical and pharmaceutical uses storage conditions and chemical incompatibility. | | | |
| | □ Boric acid, | 03 | 01 | |
| | □ Hydrochloric acid | 03 | 01 | |
| | □ Sodium hydroxide | 03 | 01 | |
| | □ Sulphur dioxide | 03 | 01 | |
| | □ Nitrogen and sodium Nitrite | 03 | 01 | |
| | □ Sodium bicarbonate | 03 | 01 | |
| | □ Aluminium Hydroxide gel | 03 | 01 | |
| | □ Bismuth subcarbonate and Kaolin. | 03 | 01 | |
| | □ Potassium and Magnesium sulphate. | 03 | 01 | |
| | □ Zinc Oxide, | 03 | 01 | |
| | □ Calamine | 03 | 01 | |
| | □ Titanium dioxide | 03 | 01 | |
| | □ Hydrogen peroxide | 03 | 01 | |
| | □ Potassium permanganate | 03 | 01 | |
| | □ Iodine | 03 | 01 | |
| | □ Solutions of Iodine | 03 | 01 | |
| | □ Boric acid | 03 | 02 | |
| | □ Mercury | 03 | 01 | |
| | □ Sulphur and its compounds | 03 | 01 | |
| | □ Calcium carbonate | 03 | 01 | |
| | □ Oxygen, Carbon dioxide, Nitrous oxide, | 03 | 01 | |
| | □ Arsenic | 03 | 02 | |
| | □ Lead and heavy metals | 03 | 02 | |
| | □ Ammonium chloride | 03 | 01 | |
| | □ Iron and ammonium citrate | 03 | 02 | |
| | | 03 | 02 | |

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|---|--|--|----|
| | | | | |
| 4 | <input type="checkbox"/> Quality control of drugs and pharmaceuticals – Importance of quality control, significant errors, methods used for quality control, sources of impurities in pharmaceuticals. Preparation, properties and uses of the following Pharmaceuticals: | | | |
| 5. | <input type="checkbox"/> Rifampicin <input type="checkbox"/> Mebendazole <input type="checkbox"/> Penicillin, Ampicillin <input type="checkbox"/> Erythromycin <input type="checkbox"/> Cephalexin <input type="checkbox"/> Griseofulvin <input type="checkbox"/> Chloroquine, Primaquine, Quinine <input type="checkbox"/> Trifluoperazine <input type="checkbox"/> Diazepam, Nitrazepam <input type="checkbox"/> Nortryptiline <input type="checkbox"/> Salbutamol <input type="checkbox"/> Furosemide <input type="checkbox"/> Glyceryl trinitrate <input type="checkbox"/> Insulin <input type="checkbox"/> Morphine, Pethidine <input type="checkbox"/> Actinomycin, Busulphan <input type="checkbox"/> Vitamins <input type="checkbox"/> Cotrimoxazole <input type="checkbox"/> Metronidazole <input type="checkbox"/> Acetyl Salicylic Acid and Paracetamol | 05 05 10 05 05 06 05 06 05 05 05 05 05 08 10 10 10 03 02 04 06 | 01 01 02 01 01 01 01 01 01 01 01 01 02 02 02 02 01 01 01 01 | |
| 6. | Practical | - | - | 75 |
| | 1. Determination of melting point of simple organic compounds | - | - | 15 |
| | 2. Preparation of buffer solutions and determination of their pH | - | - | 15 |
| | 3. Identification tests for inorganic compounds particularly drugs and pharmaceuticals | - | - | 15 |
| | 4. Limit test for chloride, sulphate, Arsenic, Iron and Heavy metals | - | - | 15 |
| | 5. Preparation of Pharmacopoeial standard – distilled water and Hydrochloric acid | - | - | 15 |
| | TOTAL = 347 | 213 | 59 | 75 |

Teaching Methods:

Lecture

Practical Demonstration

Media:

Multi media

OHP

White Board

Marker

Assessment:

Written: Essay Type (50%), SAQ (50%)

Formative, Practical and Oral Examination will be followed according to syllabus.

Paper II – Subject: Pharmacognosy

Total hours: 255 hours

Lecture: 150 hours

Practical: 45 hours

Tutorial: 60 hours

Total marks - 200

Written - 100

Oral & Practical 40+40 = 80

Formative - 20

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

1. Define Pharmacognosy, history and scope of .
2. Describe history and scope of Pharmacognosy.
3. Identify the drugs derived from plants and animals.
4. Describe the official methods of drug evaluation.
5. Describe the important active constituents, tests of identity, uses of different drugs.

Course contents:

| Sl. No | Topics/Lessons Pharmacognosy | Teaching/learning Hours | | |
|--------|--|--|--|-----------|
| | | Theory | Tutorial | Practical |
| 1 | General Introduction: <ul style="list-style-type: none"> □ Definition, History, Scope, Importance and Subject Matters of Pharmacognosy. □ Classification of drugs viz. alphabetical, morphological, chemicalpharmacological, taxonomical and chemotaxonomical 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 detail 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 | 08 08 05 08 05 05 05 02 | 03 02 03 02 02 02 05 02 | |
| 2 | Study of Morphological, Microscopical and cell wall Constituents of crude drugs. <ul style="list-style-type: none"> □ Study of cell wall constituents and cell inclusions. □ Study of morphology and microscopy of different plant parts. <ol 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 | 12 | 05 | |

| Sl. No | Topics/Lessons Pharmacognosy | Teaching/learning Hours | | |
|-------------------|---|--|--|-----------|
| | | Theory | Tutorial | Practical |
| 3 | <i>General study of the chemical classification of drugs with special reference to the followings:</i> <input type="checkbox"/> Carbohydrate and related compounds: Dextrose, Fructose, Lactose. <input type="checkbox"/> Glycosides: Aloes and Digitalis <input type="checkbox"/> Tannins: Tannin <input type="checkbox"/> Lipids: Olive oil, Castor oil, Shark liver oil, Coca butter, Wool fat, Bees wax <input type="checkbox"/> Volatile oil: Oil eucalyptus <input type="checkbox"/> Resins & resin compounds: Balsam tolu <input type="checkbox"/> Alkaloids: Belladonna and opiums <input type="checkbox"/> Vitamins and vitamin containing drugs: Vitamin A, B, C, D, E & K. <input type="checkbox"/> Study of Natural Pesticides (Pyrethrum, Neem, tobacco) <input type="checkbox"/> Study of plant constituents a) Brief study of various plant constituents. b) Biological source, method of production, Chemical constituents, tests, uses and adulterants of: i) Isapgol (ii) Linseed (iii) Honey (iv) Acacia (v) Agar (vi) Tragacanth | 06 06 04 10 07 07 07 10 06 15 | 02 02 02 05 02 02 02 02 02 05 | |
| 4 | Study of plant fibers used in surgical dressing and related products. | 04 | 02 | |
| 5 | <i>Medicinal plants of Bangladesh:</i> <input type="checkbox"/> A brief study including their collection, cultivation, harvesting, storage, constituents and uses | 10 | 05 | |
| 6 | Practical: a. <i>Morphological examination of the following crude drugs:</i> <input type="checkbox"/> Cinamon, Cardamon, Clove, Ginger, Datura, Rauwolfia & Belladonna, Senna, Nux Vomica and Ephedra. b. <i>Microscopical examination and qualitative tests of the above drugs in the powdered form as far as practicable</i> | | | 20 10 |
| 7 | Test for identification of /adulterants in: a) Castor oil b) Shark Liver oil c) Wool fat d) Bees was e) Sesame oil | | | 10 |
| Total = 270 HOURS | | 150 | 60 | 45 |

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media, OHP, White Board, Marker, Assessment:

Written : Essay Type (50%), SAQ (50%)

Formative, Practical and Oral Examination will be followed according to syllabus.

Paper III: Subject- Pharmaceutics

Total hours: 260 hours
Lecture: 151 hours
Practical: 75 hours
Tutorial: 34 hours

Total marks - 200
Written - 100
Oral & Practical 40+40 = 80
Formative - 20

Objectives:

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

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

Course contents:

| Sl. No | Topics/Lessons <i>Pharmaceutics</i> | Teaching/learning Hours | | |
|--------|--|--|--|-----------|
| | | Theory | Tutorial | Practical |
| 1 | Pharmaceutical mathematics: <input type="checkbox"/> Metrology – System of weight and measures. Calculations including conversion from one to another system. Percentage calculations and adjustment of products Use of allegation method in calculations. Isotonic solutions. <input type="checkbox"/> Density, specific gravity and specific volume | 10 04 | 02 01 | - |
| 2 | Physical Pharmaceutics: <input type="checkbox"/> P^H buffers and isotonic solutions : P^H and its effects on solubility , applications buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, applications, buffered isotonic solutions. <input type="checkbox"/> Solubility Phenomena: Solvent solute interactions. solubility of gas in liquids, solubility of liquids in liquids. Solubility of solids in liquids: Definitions, determinations, factors influencing the solubility. <input type="checkbox"/> Kinetics: rates and molecularity of a reaction, determination of order, factors influencing rate of reactions, stabilization of drugs, applications of chemical kinetics to the stability testing of pharmaceuticals. <input type="checkbox"/> Diffusion and dissolution: Steady state diffusion, types of diffusion, diffusion equation, diffusion cells, Dissolution of tablets and capsules. Factors affecting dissolution. <input type="checkbox"/> Coarse dispersions: suspensions: Setting in Suspension, wetting, Controlled flocculation in structured vehicles, Rheological consideration, preparation, physical stability and evaluation of suspensions. <input type="checkbox"/> Emulsions: Definition, mechanism of action of emulsifying agents, theories of emulsification. Formulation of emulsions-instability of emulsions, evaluation of emulsion stability. | 06 08 08 08 05 05 | 02 02 02 02 02 01 | - |

| Sl. No | Topics/Lessons <i>Pharmaceutics</i> | Teaching/learning Hours | | |
|--------|--|--|--|-----------|
| | | Theory | Tutorial | Practical |
| | <p>a) Sterility testing, particulate monitoring-Faculty seal packaging.</p> <p>b) Ophthalmic products-study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.</p> <p>c) Dental and cosmetic preparations: Introduction to Dentrifices, facial cosmetics, Deodorants. Antiperspirants, shampoo, Hair dressings and hair removers.</p> <p>Semi-Solid Dosage forms:</p> <ul style="list-style-type: none"> • Ointments: Types and preparations of Ointments. Characteristics of ointment base. • Suppositories and pessaries – Their relative merits and demerits, types of suppositories, suppository bases, classification, properties. Preparation and packing of suppositories. Use of suppositories of drug absorption. • Pastes: Differences between ointments and pastes, Bases of pastes. Preparation of pastes and their preservation <p>Solid dosage form: Tablet, tablet ingredients, advantages and disadvantages of tablets. Different types of tablets.</p> <p>Liquid dosages form:</p> <ul style="list-style-type: none"> • Suspension, Characteristics of suspending agents. Advantages and disadvantages of suspensions. • Emulsion, Qualities of Emulsifying agents, Pharmaceutical application | 10 05 05 05 | 03 01 01 01 | |
| 3 | <p>Pharmaceutical technology:</p> <ul style="list-style-type: none"> □ Packaging of pharmaceuticals-Desirable features of a container-types of containers. Study of glass and plastics as materials of containers and rubber as a material for closure-their merits and demerits. □ Extraction and Galenicals- Study of percolation and maceration and their modification, continuous hot extraction. Application in the preparation of tinctures and extracts. □ Sterilization – Concept of sterilization and its differences from disinfection-Thermal resistance of micro-organisms. Detailed study of the following sterilization process. <ol style="list-style-type: none"> 1. Sterilization with moist heat, 2. Dry heat sterilization 3. Sterilization by radiation, 4. Sterilization by filtration and 5. Gaseous sterilization. ♦ Aseptic techniques- Applications of sterilization process in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment. ♦ Study of immunological products like sera, vaccines, toxoids & their preparations. ♦ Incompatibilities in prescriptions-study of various types of incompatibilities-physical, chemical and therapeutic. ♦ Sterile dosage forms: <p>d) Parenteral dosage forms-Definition, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and quality control.</p> | 08 08 15 08 05 06 10 | 02 02 02 01 01 01 02 | |

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|--|-------------------------|----------|----------------------|
| | | Theory | Tutorial | Practical |
| | Of emulsions. Instabilities in emulsions. preservation of emulsions. | | | |
| | Liquids for internal administration: <ul style="list-style-type: none"> • Mixtures and concentrates, • Syrup • Elixirs | 03 | 01 | |
| | Liquids for external administration: <ul style="list-style-type: none"> • Gargles • Mouth Washes • Ear Drops • Nasal drops & sprays • Liniments • Lotions | 05 | 01 | |
| | A general Knowledge of: <ul style="list-style-type: none"> • Colour & flavour/Preservatives and antioxidants | 03 | 01 | |
| 4 | Practical: <ol style="list-style-type: none"> a. Preparation of percentage solution and Molar solution b. Preparation of ointments by slab and spatula method c. Preparation of Mixtures, Syrups, Elixirs, Emulsions, Suspensions, Powders, Medicated cream d. Capsule filling (manual) including hygroscopic substance | | | 10 10 40 15 |
| | TOTAL =260 | 151 | 34 | 75 |

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board
Marker

Assessment:

Written: Essay Type (50%), SAQ (50%)
Formative, Practical and Oral Examination will be followed according to syllabus.

Paper IV: Subject- Pharmacology

Total hours: 262 hours
 Lecture : 125 hours
 Practical : 75 hours
 Tutorial : 62 hours

Total marks - 200

Written - 100
 Oral & Practical 40+40 = 80
 Formative - 20

Objectives:

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

1. Describe the general principles of pharmacology .
2. Define and classify different type of drugs.
3. Explain the mode of action, of different drugs.
4. Describe the metabolism of drugs in the human body.
5. Identify different groups of drug and explain their applications in clinical practice.
6. Mention the toxic effects of drugs.

Course contents:

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|--|-------------------------|----------|-----------|
| | | Theory | Tutorial | Practical |
| 1. | General Pharmacology: | | | |
| | □ Introduction and definitions – Sources and active ingredients of drugs | 02 | 01 | |
| | □ Routes of administration of drugs. | | | |
| | □ Absorption of drug and the factors affecting them. | 02 | 01 | |
| | □ Drug distribution, Bio-transformation and Excretion | 02 | 01 | |
| | □ Mechanism of drug action Drug-receptor interactions and molecular & biochemical basis of drug action. Additive effect, synergism, potentiation | 04 | 01 | |
| | □ Factors modifying drug effects. | 04 | 01 | |
| | □ Drug toxicity | | | |
| | □ Dose response relationship, structure activity relationship | 01 | 01 | |
| | □ Drug interactions: Basic concepts of Drug interactions. | 02 | 01 | |
| | | 02 | 01 | |
| | Note: the term Pharmacology used here refers to the classification, mechanism of action, Pharmacokinetics, pharmacodynamics, adverse effects, contraindications, therapeutic uses and dosage. | 01 | 01 | |

| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
|--------|--|--|--|-----------|
| | | Theory | Tutorial | Practical |
| 2. | <i>Pharmacology of Drugs acting on different systems</i> | | | |
| a) | i) Autonomic Nervous System <input type="checkbox"/> Introduction Neurohumoral Transmission <input type="checkbox"/> Adrenergic and Cholinergic receptors <input type="checkbox"/> Adrenergic drugs. <input type="checkbox"/> Adrenergic receptor blockers, adrenergic neuron blockers. <input type="checkbox"/> Cholinomimetics, Anticholinesterases. <input type="checkbox"/> Antimuscarinic agents <input type="checkbox"/> Ganglionic blockers and stimulants <input type="checkbox"/> Neuromuscular blocking agents <input type="checkbox"/> Drugs used in parkinsonism and myasthenia gravis. Definition: Health, Drug, Pharmacology, Pharmacokinetics and Pharmacodynamics. | 02 02 02 02 03 02 02 02 02 | 01 01 01 01 01 01 01 01 01 | |
| | ii) Central Nervous System <input type="checkbox"/> General Consideration (Introduction) <input type="checkbox"/> Alcohol <input type="checkbox"/> General Anaesthetics/Local Anaesthetics <input type="checkbox"/> Sedatives and hypnotics <input type="checkbox"/> Anti-convulsants <input type="checkbox"/> Narcotic analgesics <input type="checkbox"/> Non-steroidal anti inflammatory agents and Analgesics <input type="checkbox"/> Psychopharmacological agents: antipsychotics, Antidepressants, Anxiolytics <input type="checkbox"/> Drug dependence and drug abuse | 01 01 03 03 02 04 05 03 02 | 01 01 01 01 01 01 01 01 01 | |
| b) | Renal System (diuretics) and antidiuretics. | 03 | 01 | |
| c) | Blood and Blood forming gAgents <input type="checkbox"/> Coagulants and anti-coagulants. <input type="checkbox"/> Haemopoietics. <input type="checkbox"/> Thrombolytics and antiplatelet agents. | 02 02 02 | 01 01 01 | |
| d) | Respiratory system <input type="checkbox"/> Respiratory stimulants <input type="checkbox"/> Bronchodilators <input type="checkbox"/> Nasal decongestants <input type="checkbox"/> Expectorants and Antitussive agents | 01 02 01 02 | 01 01 01 01 | |
| e) | Cardiovascular System <input type="checkbox"/> Anti-hypertensives <input type="checkbox"/> Anti-anginal drugs <input type="checkbox"/> Anti-arrhythmic drugs. <input type="checkbox"/> Drugs used for therapy of congestive cardiac failure <input type="checkbox"/> Drugs used in hyperlipidaemias | 02 02 02 02 02 | 01 01 01 01 01 | |
| Sl. No | Topics/Lessons | Teaching/learning Hours | | |
| | | Theory | Tutorial | Practical |

| | | | | |
|----|--|-----|----|----|
| f) | Digestive system | 02 | 02 | 02 |
| | <input type="checkbox"/> Carminatives, | 02 | 02 | 02 |
| | <input type="checkbox"/> Digestants | 02 | 02 | 02 |
| | <input type="checkbox"/> Bitters | 02 | 02 | 02 |
| | <input type="checkbox"/> Antacids and drugs used in peptic ulcer | 02 | 02 | 02 |
| | <input type="checkbox"/> Purgatives and laxatives. | 02 | 02 | 02 |
| | <input type="checkbox"/> Antidiarrhoeals | 02 | 02 | 02 |
| | <input type="checkbox"/> Emetics and Antiemetics | 02 | 02 | 02 |
| | <input type="checkbox"/> Antispasmodics | 02 | 02 | 02 |
| g) | Hormones and hormone antagonists. | 02 | 02 | 02 |
| | <input type="checkbox"/> Hypoglycemic agents | 02 | 02 | 02 |
| | <input type="checkbox"/> Antithyroid drugs | 02 | 02 | 02 |
| | <input type="checkbox"/> Sex Hormones and oral contraceptives | 02 | 02 | 02 |
| | <input type="checkbox"/> Corticosteroids | | | |
| h) | Miscellaneous: Histamines/Antihistamines/Prostaglandins | 03 | 03 | 03 |
| 3. | Chemotherapy of microbial disease: | | | |
| | <input type="checkbox"/> Urinary antiseptics | 01 | 01 | 01 |
| | <input type="checkbox"/> Sulphonamides. | 01 | 01 | 01 |
| | <input type="checkbox"/> Penicillins. | 01 | 01 | 01 |
| | <input type="checkbox"/> Streptomycin | 02 | 02 | 02 |
| | <input type="checkbox"/> Tetracyclines and Other antibiotics | 01 | 01 | 01 |
| | <input type="checkbox"/> Antitubercular agents | 01 | 01 | 01 |
| | <input type="checkbox"/> Antifungal agents | 01 | 01 | 01 |
| | <input type="checkbox"/> Antiviral drugs | 01 | 01 | 01 |
| | <input type="checkbox"/> Antileprotic drugs | 01 | 01 | 01 |
| 4. | Chemotherapy of Cancer | | | |
| 5 | Practical | | | |
| | 1. Determination of melting point of simple organic compounds | | | |
| | 2. Preparation of buffer solutions and determination of their pH | | | |
| | 3. Identification tests for inorganic compounds particularly drugs and pharmaceuticals | | | |
| | 4. Limit test for chloride, sulphate, Arsenic, Iron and Heavy metals | | | |
| | 5. Preparation of Pharmacopoeial standard – distilled water and Hydrochloric acid | | | |
| | Total | 125 | 62 | 75 |

Teaching Methods:

Lecture

Practical Demonstration

Media:

Multi media , White Board

Marker

Assessment:

Written: Essay Type (50%). SAQ (50%)

Formative, Practical and Oral Examination will be followed according to syllabus.

Paper V: Basic Computer Science

Total hours: 100 hour
Lecture: 25hour (Lt No = 25)
Practical / Tutorial: 75 hours

Total marks-100
Written-50
Oral & practical- 40
Formative- 10

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

1. Acquainted with the modern computer technology
2. Develop skills in MS Word, MS-Excel, Power Point, Internet
3. Prepare reports of various investigations
4. Collect latest information through internet

Contents:

| Sl. No | Topics/Lessons | Teaching/learning Hours | |
|--------|--|-------------------------|-----------|
| | | Theory | Practical |
| 1. | <p>Detailed Contents : Relevant Instruction for Practical :</p> <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, alpha 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. <ul style="list-style-type: none"> ▪ 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 MS-DOS 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 | |

| Sl. No | Topics/Lessons | Teaching/Learning Hours | |
|--------|---|-------------------------|-----------|
| | | Theory | Practical |
| | <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 | | |
| | <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 colour, 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 tolls • 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, thesaurus word content and statistics, printing envelops and lables • 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 | |
|--------|--|-------------------------|-----------|
| | | Theory | 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, organise, 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, deletion 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, customising a pivot table. Statistical analysis of data. Customise MS-Excel: How to change view of worksheet, outlining a worksheet, customise 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 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%), Oral and Practical- (40%), Formative- (10%)

3rd Year**Paper I: Subject - General, Community & Hospital Pharmacy**Total hours: 88 hours

Lecture - 58 hours

Tutorial - 30 hours

Total marks - 200

Written - 100

Oral - 80

Formative - 20

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

1. Communicate the patient with the patients, physicians, nurses, pharmacists and other staffs
2. Maintain stock register.
3. Prepare annual reports and budget with drug storage.
4. Compound and dispense different preparations according to prescription.
5. Advice to the patient.
6. Practice the rational use of drugs to the patients.
7. Provide Primary Health Care as a pharmacist.

Course contents

| Sl. No | Topics/Lessons | Teaching/learning hours | |
|--------|---|-------------------------|----------|
| | | Theory | Tutorial |
| 1. | General Pharmacy: | | |
| a) | <i>Weight & Measure:</i> System International Unit(SIU)/ British Systems & their relationship | 05 | 01 |
| b) | <i>Pharmaceutical Latin:</i> A general knowledge of the Latin as used in the prescriptions for interpretation and translation | 02 | 01 |
| c) | Surface Active Agents. Pharmaceutical Applications and Medical Importance of surface active agents | 01 | 01 |
| d) | <i>Posology:</i> A general knowledge of different factors for determining doses/ Calculation of children's doses from adult doses/ Detection of overdoses from prescriptions. | 06 | 01 |
| e) | A general knowledge of Herbal Medicine and Phytopharmaceuticals. | 02 | 01 |

| Sl. No | Topics/Lessons | Teaching/learning hours | |
|--------|---|-------------------------|----------|
| | | Theory | Tutorial |
| f) | A general knowledge of apparatus and equipment used in pharmacy for compounding & dispensing of medicines. | 02 | 01 |
| g) | Prescriptions and its various parts/ Rules of receiving, dispensing, checking, delivery and recording of prescriptions. Prescribed medication order and interpretation. | 04 | 01 |
| h) | A general knowledge of stability of drugs & importance of date expiry of drugs. | 02 | 01 |
| i) | Rules and methods of storage and preservation of pharmaceuticals with special reference to sera and vaccines, antibiotics, vitamins, hormones etc. | 02 | 01 |
| j) | General concepts of health and disease, disease causing agents and prevention of disease. | 02 | 01 |
| 2. | Community Pharmacy | | |
| a) | The Community Pharmacy: Definition | 01 | 01 |
| b) | Establishment of Community Pharmacy: i) Organization ii) Site selection iii) Capital requirements iv) Cash v) Inventory vi) Fixtures and equipments vii) Total investment and sources of capital | 02 | 01 |
| c) | Pharmacy Management: 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 | 04 | 01 |
| d) | Trends: Growth of Chain Pharmacies/ Outpatient services by Institution/ Pharmacy manpower/ Third party payment/ Determination of prescription charges | 03 | 01 |
| e) | Patient Counselling in Community Pharmacy including OTC Products. | 01 | 01 |
| f) | Drug Dependence and misuse in Bangladesh | 01 | 01 |

| Sl. No | Topics/Lesson | Teaching/learning hours | |
|--------|---|--|--|
| | | Theory | Tutorials |
| 3. | <input type="checkbox"/> <i>Immunological products and vaccines (Special emphasis on EPI vaccines):</i> <input type="checkbox"/> Various types of hospitals and their organisational pattern <input type="checkbox"/> Organisation of hospital pharmacy <input type="checkbox"/> Duties and responsibilities of a hospital pharmacist <input type="checkbox"/> Hospital formulary <input type="checkbox"/> Purchase and inventory control <input type="checkbox"/> Control of special classes of drugs <input type="checkbox"/> Dispensing to in & out-patients <input type="checkbox"/> Record keeping and preparation of the annual report of the hospital dispensing <input type="checkbox"/> Investigational drugs <input type="checkbox"/> Bulk compounding and manufacturing <input type="checkbox"/> Drugs information services <input type="checkbox"/> Hospital Pharmacist and Drug Information Services <input type="checkbox"/> Pharmacy services in small hospitals and nursing home | 02 01 01 01 01 01 01 01 03 01 01 01 01 02 | 01 01 01 01 01 01 01 01 01 01 01 01 01 01 |
| | TOTAL = 88 | 58 | 30 |

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board
Marker

Assessment:

Written : Essay Type (50%), SAQ (50%)
Formative, Practical and Oral Examination will be followed according to syllabus.

Paper II: Subject - Integrated Health Care

Total hours: 102 hours

Lecture - 83 hours

Tutorial - 19 hours

Total marks - 200

Written - 100

Oral - 80

Formative - 20

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

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

Course contents:

| Sl. No | Topics/Lessons | Teach/Learning hours | |
|--------|--|----------------------|----------|
| | | Theory | Tutorial |
| 1 | <i>Immunological Products and Vaccines:</i> | | |
| | <i>Immunological products and vaccines(Special emphasis on EPI vaccines):</i> | | |
| a. | <i>Vaccines included under EPI Programme:</i> □ DPT, Polio (Oral), BCG, Measles | 08 | 02 |
| b. | <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 □ Storage and use of vaccines | 10 | 02 |
| c. | <i>Vaccines and antisera:</i> □ BCG, Cholera, Diptheria, German Measles, Hepatitis-B, Influenza, Measles, Mumps, Pertusis, Pneumococcal, Poliomyelitis, Rabies, Smallpox, Tetanus, Typhoid and Yellow Fever Vaccines | 15 | 02 |
| d. | <i>Immunoglobulin:</i> Normal gamma globulin/ Specific immunoglobulin (Anti Hbs, Anti-rabies, Anti-tetanus), Anti-D (Rho) Immunoglobulin | 04 | 02 |

| Sl. No | Topics/Lessons | Teach/learning hours | |
|--------|---|----------------------|----------|
| | | Theory | Tutorial |
| 2 | <i>Products recommended for Primary Level Health Care</i> | | |
| | <i>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:</i> | 20 | 05 |
| i | Name of chemical substances Dosage forms Aluminium Hydroxide Magnesium Tablet/ Oral suspension | | |
| ii | Trisilicate/ Mg Hydroxide Ampicillin | | |
| iii | | | |
| iv | Benzyl Benzoate Chloramphenicol | | |
| v. | susp/ Inj /eye & ear drop/cream | | |
| vi. | Ergometrine/ Methyl Ergometrine Tablet/Injection | | |
| vii | Ferrous Salt + Folic Acid | | |
| viii | folic) | | |
| ix. | Hyoscine Butyl Bromide Tablet/Injection | | |
| x. | Lynoestrenol + Ethynyl Oestrediol Tablet | | |
| xi. | Mebendazole Tablet/ Oral suspension | | |
| | Oral Rehydration Salt Sachet for solution | | |
| | Tetracycline Capsule/ Powder for Inj/ | | |
| | Eye, ear & topical ointment | | |
| xii | <i>Name of Chemical substances Dosage forms</i> <i>Paracetamol Tablet/Elixir/Suppository</i> | | |
| xiii | <i>Phenoxymethyl Penicillin Tablet/ Powder for oral susp</i> | | |
| xiv | <i>Salbutamol Tablet/ Syrup/ Injection</i> <i>Oral inhalation Aerosol</i> | | |
| xv. | <i>Vitamin Tablet/Capsule/ Inj/ Syrup</i> | | |

| Sl. No | Topics/Lesson | Teaching/learning hours | |
|--------------------|---|-------------------------|-----------|
| | | Theory | 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) <i>Contraceptive Methods:</i> General information about contraceptives/ Selection/ Caution/ Warning signs/ Risks/Side effects and complications/Technique/ Doses and uses of: | 02 | 01 |
| B. | Temporary Methods: | 14 | 03 |
| a) | | | |
| i. | Safe Periods/ Abstinence etc | | |
| ii. | Barrier methods- Condoms/ Diaphragm/ Caps/ Mechanical (Intra- Uterine Device: Copper-T, Coils) | | |
| iii. | Hormonal contraceptives: Oral Pill: Combination/ Low dose pill/ Progesteron only pill, male pill Depot forms: Injectables/ Norplant | | |
| b) | 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 | 10 | 02 |
| TOTAL = 102 | | 83 | 19 |

Teaching Methods:

Lecture
Practical Demonstration

Media:

Multi media
OHP
White Board
Marker

Assessment:

Written : Essay Type (50%), SAQ (50%)
Formative, Practical and Oral Examination will be followed according to syllabus.

Paper III: Subject - Forensic Pharmacy & Ethics

Total hours: 80 hours
Lecture - 60 hours
Tutorial - 20 hours

Total marks - 100
Written - 75
Oral - 25

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

1. Describe the Drug Rules, Drug Acts, Pharmacy Ordinance and their implications on Pharmacy practice.
2. Explain the role of a pharmacist in promoting Pharmacy profession.
3. Describe Code of Conduct in Pharmacy.

Course contents

| Sl. No | Topics/Lessons | Teach/learning hours | |
|-------------------|---|----------------------|-----------|
| | | Theory | Tutorial |
| 1 | The Drugs Act, 1940 and Drug Rules | 10 | 02 |
| 2 | The Dangerous Drugs Act, 1930 | 05 | 02 |
| 3 | The Pharmacy Ordinance, 1976 | 03 | 02 |
| 4 | The Poisonous Act 1919 and Poison Rules | 05 | 02 |
| 5 | Narcotic Act | 05 | 02 |
| 6 | The Insecticides Act | 02 | 02 |
| 7 | Drug Control Ordinance, 1982 and such other Acts and Rules which materially affect pharmacy profession and dispensing of drugs | 10 | 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. | 10 | 02 |
| 9 | Pharmacists Code of Ethics framed by Pharmacy Council of Bangladesh | 04 | 02 |
| 10 | Codes of Conducting/ Dispensing/ Advertising of Drugs | 03 | 01 |
| 11 | National Drug policy of Bangladesh | 03 | 01 |
| TOTAL = 80 | | 60 | 20 |

Teaching Methods:

Lecture
 Practical Demonstration

Media:

Multi media, OHP
 White Board
 Marker

Assessment: Written : Essay Type (40%), SAQ (35%)

Paper IV: Subject - Field Training Course

Field Training: 600 hours

Total marks - 100

Field Assessment - 50

Oral -50

Objectives : *At the end of field site training programme, the students will be able to:*

1. Communicate with the patients, physicians, nurses, staff and other pharmacists.
2. Maintain stock registers and prepare annual reports and budgets in drug storage.
3. Compound and dispense different preparations according to the prescription.
4. Educate the patient about proper use of drugs.
5. Provide first aid treatment to the patients when needed.

Course contents:

| Sl. No | Topics/Lessons | Full time Field Placement | |
|--------|---|---------------------------|--|
| 1 | Compounding and Dispensing for indoor and outdoor patients | | |
| 2 | Preparation of Mixture, Solution, Powder & Ointments | | |
| 3 | Preparation and Sterilization of Surgical and Dressings instruments and appliances | | |
| 4 | Filling and labelling of medical containers | | |
| 5 | Dispensing of Narcotic Drugs | | |
| 6 | Maintenance of sufficient stock of antidote for poisonings and emergency drugs | | |
| 7 | Detailing about drugs to physicians, internees and nurses | | |
| 8 | Maintenance of Registers in proper system | | |
| 9 | Maintenance of proper procedure of requisitioning and dispensing of all drugs and medicines | | |
| 10 | Preparing periodic reports, annual reports, budgets of the hospital dispensing | | |
| 11 | Preparation of budgets for the various purposes of hospitals/ dispensaries and control of the supplies | | |
| 12 | Storage of drugs | | |
| 13 | The organisation of Hospital Pharmacy | | |
| 14 | Use of First Aid Kits, Practical demonstration of First Aid and observation of vaccination | | |
| 15 | Delivery and recording of prescription and noting of incompatibilities, drug interactions in prescription | | |
| 16 | Different routes of administration of drugs and medicines | | |
| 17 | Drug abuse | | |

| Sl. No | Topics/Lessons | Full time Field Placement | |
|--|---|---------------------------|--|
| 18. i) a) b) c) d) e) ii) a) b) c) | Primary Health Care in the field practice at village level: Health Education programme: a) Personal Hygiene (Healthful living) b) Surrounding hygiene (Residential houses) c) Food & Nutrition (Including pure drinking water) d) Family Planning e) Education of waste disposal (Excreta refuse) Primary Health Care: a) Identification of prevailing diseases in the area and their organisms b) Specially Epidemic diseases like Diarrhoea, Dysentery, Cholera, Typhoid, Tuberculosis, Small & Chicken Pox, Malaria, Influenza, Diphtheria, Measles infection c) Curative & Preventive measures | | |
| Total = 18 Weeks (600 Hours) | | | |

Teaching Methods:

Small Group Teaching
Tutorial

Media:

Multi media
OHP
White Board
Marker

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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