Diploma of medicinal chemistry

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC 101</td>
<td>Human Physiology &amp; Immunology</td>
<td>This subject covers the knowledge of human physiology and all systems in the human body with more focus on the immune system. It introduces common terms, concepts, fundamental procedures and applications used in both physiology and immunology.</td>
</tr>
<tr>
<td>BMC 102</td>
<td>Clinical chemistry I</td>
<td>Provides the basic knowledge concerning the properties of carbohydrates, lipids and proteins, and their significance in biological systems. It will initially introduce the common and basic bioreactions occur within the human body. It aims to provide an overview of metabolism and emphasizes the relationship between anabolism and catabolism, and their role in maintaining life.</td>
</tr>
<tr>
<td>BMC 201</td>
<td>Mathematics &amp; Biostatistics</td>
<td>Equip you with the basic applied mathematical concepts and techniques that are essential for your course of study. Topics include the application of statistics and mechanics. The section on statistics covers investigations into basic statistics, sampling distribution, hypothesis testing and analysis of variances. The section on mechanics includes investigations into statistics, kinematics, Newton’s Laws of Motion, circular motion and impulses.</td>
</tr>
<tr>
<td>BMC 202</td>
<td>Fundamental pathology and Histopathological techniques</td>
<td>Provides an introduction to the mechanisms and progression of diseases and to the morphology, molecular, cellular, tissue, and organ changes. Topics include cellular adaptations and tissue damage (degeneration and cell death), inflammation, healing and repair, hemodynamic disorders, tumorigenesis and organ pathologies. At the end of the module, students will have built the foundation of understanding of the pathogenesis of diseases and the interpretation. Provides the practical foundation in techniques based on histopathology. Emphasis is given to the ability to apply theory to bench practice in tissue fixation and processing, staining (routine and special stains), immunohistochemistry and instrumentation. Cryotomy and exfoliative cytology are also introduced.</td>
</tr>
<tr>
<td>BMC 203</td>
<td>Clinical Chemistry II</td>
<td>Skills the candidate with all essential knowledge to understand pathophysiological changes in disease. Provides the tools and concepts in clinical chemistry for diagnosis, prognosis, monitoring and screening of disease. Empower the ability to link the purpose and limitations of specific laboratory tests to the theoretical knowledge and understanding of clinical chemistry. It also provides you with the basic skills and understanding in laboratory tests carried out in the clinical chemistry laboratory.</td>
</tr>
<tr>
<td>BMC 105</td>
<td>Haematology</td>
<td>Provides the theoretical foundation and practical skills in haematology. It covers the structure and function of all blood components. Discusses the normal development of the blood components and correlates common blood disorders. It also covers laboratory investigations of anaemia, haemoglobinopathies, thalassaemia, haemostasis, blood parasites and haematopoietic stem cell disorders.</td>
</tr>
<tr>
<td>BMC 103</td>
<td>Molecular diagnostics</td>
<td></td>
</tr>
</tbody>
</table>
Provides you with the basic theoretical and practical knowledge of Molecular Biology. Topics include the molecular biology techniques, gene regulation in eukaryotes, eukaryotic viruses, genetics and cancer. Essential techniques for the advanced molecular diagnostics and kits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC 104</td>
<td>Medical and Diagnostic Microbiology</td>
</tr>
<tr>
<td></td>
<td>This subject has a theoretical and practical focus that allows you to apply your knowledge acquired in Basic Microbiology to the fields of food, industry, medicine and environment. Study of the characteristics and behavior of microbial agents that cause infectious diseases in humans. Also within its scope is the application of the above knowledge for the diagnosis as well as prevention and control of these diseases.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC 204</td>
<td>Laboratory Management &amp; Quality Assurance</td>
</tr>
<tr>
<td></td>
<td>This subject covers basic principles and techniques of laboratory safety, and management as well as quality assurance, risk assessment and management. Provides proper framework of good laboratory practices and total quality management.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC 205</td>
<td>Major Project</td>
</tr>
<tr>
<td></td>
<td>This subject provides a framework for you to solve practical problems, conduct research work and/or develop studies, through a self-managed project. The scope of the subject includes project proposal, investigative studies, analysis, interpretation of results, written report and presentation.</td>
</tr>
</tbody>
</table>

**Elective courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC E01</td>
<td>Good Dispensing Practice &amp; Pharmacotherapy</td>
</tr>
<tr>
<td></td>
<td>Provides the fundamentals of good dispensing practice for all clinical samples. Ethical concerns for clinical samples handling and confidentiality. Provides orientation for the legal aspects and requirements laboratories. It eventually covers all necessary measures and precautions to be considered during handling a patient under treatment with special drugs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC E02</td>
<td>Applied Immunology</td>
</tr>
<tr>
<td></td>
<td>This subject covers the immunopathology and immunological techniques used in screening, diagnosis and monitoring of diseases. It also deals with the way in which our immune system is manipulated for prevention and treatment of diseases through immunization, immune suppression and immune modulation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC E03</td>
<td>Blood Banking</td>
</tr>
<tr>
<td></td>
<td>This subject provides the basic knowledge of blood banking and covers the theoretical, practical and clinical aspects of blood transfusion. There is emphasis on the application of immunologic principles as applied to blood grouping, tissue typing and compatibility testing. It also stresses the importance of laboratory quality control and clinical considerations in transfusion practices.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMC E04</td>
<td>Occupational Safety &amp; Health</td>
</tr>
</tbody>
</table>
Covers health issues and safety at the workplace. The section on health examines the causes of occupational diseases and their respective controls (heat stress/strain, ventilation, noise and industrial lighting). The section on safety explores topics like machinery safety, electrical safety, hazards of fire and explosion, housekeeping and material handling, personal protection equipment and legislation concerning occupational safety and health.

<table>
<thead>
<tr>
<th>BMC E05</th>
<th>Biopharmaceutical Unit Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>This subject emphasises the application of engineering principles in the unit operations commonly employed in the upstream, pharmaceutical industry. Topics covered include reagent handling, dissolution, extraction, distillation, crystallisation, filtration and drying. It also covers the various fractionation processes and mechanical operations including solids handling, sieving, milling and communication. Commonly used equipment in pharmaceutical manufacturing are also introduced.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMC E06</th>
<th>Communication skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide the necessary skills to understand and apply the theories and principles of communication to ensure that the message they wish to convey is communicated effectively, as well as understand the cultural considerations in communication.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMC E07</th>
<th>Cell Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td>This subject covers the biology of cells of higher organisms: structure-function relationships of cellular membranes and internal organelles, cell cycle and cell division; transport mechanisms and cell communication, cell motility and the cytoskeleton and cell death. Provide the basic practical fundamentals required for biology and molecular labs.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMC E08</th>
<th>Process Control &amp; Instrumentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduce the basic concepts and principles of process control and instrumentation in chemical process industries. Highlight the latest updates and development in process control. Give the insights of the worldwide updates of instrumentation technologies. Provide the basic concept of process control and open and closed-loop control systems.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMC E09</th>
<th>Basic Pharmacology</th>
</tr>
</thead>
<tbody>
<tr>
<td>The study of drug metabolic processes. Phases, reactions, and reaction mechanisms of metabolic pathways. In addition to the study of factors affecting drug metabolism and drug-metabolizing enzyme systems.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BMC E10</th>
<th>Fundamentals of ISO 15189</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equip the candidates with all essential fundamentals in how to implement a quality management in a lab, provide the knowledge of the major managerial and technical requirements for lab accreditation, increase the skills of the good laboratory practices.</td>
<td></td>
</tr>
</tbody>
</table>

---

**Master of medicinal chemistry**

**Fundamental courses:**

**MCM1 - Basic microbiology & immunology**

An introduction to the microbes and immune system as they relate to human health (reviews the basic properties of medically relevant bacteria, viruses and
fungi, how these organisms cause disease, and the body's immune resistance mechanisms.

**MCP1 - Basic pharmacology & Drug metabolism**
The study of drug metabolic processes. Phases, reactions, and reaction mechanisms of metabolic pathways. In addition to the study of factors affecting drug metabolism and drug-metabolizing enzyme systems.

**MCC1 - Cell and tissue biology**
Provides students with a basic foundation of the structure and function of cells, tissues, and organ systems in the human body.

**MCN1 - Natural products chemistry**
Activity guided isolation and fractionation of natural compounds from natural source. It will also cover special techniques of certain importance in phytochemical research.

**MCS1 - Special topics in medicinal chemistry**
To cover the up-to-date aspects of medicinal chemistry such as: computer-aided drug design, combinatorial chemistry, and new drug classes.

**MCT1 - Cellular and molecular Toxicology**
The effect of toxic compounds in organisms; at organ, cellular, organelle and molecular level. The presence of toxic compounds in our ambient environment including factors, for example from food, which may modify the toxicological effect of these compounds. After an introduction to general toxicology the focus will be on specific toxicological disciplines such as neurotoxicology and immunotoxicology together with model systems and risk assessment.

**MCB2 - Medical biochemistry**
At the molecular level, this course provides students with the basic foundation of biochemistry as related to physiology, pathology, pharmacology, disease diagnosis and treatment methods.

**MCG2 - Medical genetics**
Reviews basic genetic principles, and provides students with skills in recognizing and managing chromosomal, single gene, and multifactorial disorders.

**MCQ2 - Quality control of medicinal plants**
All aspects related to herbal drugs and their evaluation, sampling, macroscopical and microscopical examination, qualitative and quantitative analyses. Tests for adulteration and pollutants, storage and preservation methods

**MCS2 - Biostatistics**
Statistical methods and reasoning, with an emphasis on the techniques and terms commonly encountered in research, are presented as tools for students to determine the impact of research on practice

**MCP2 - Molecular pharmacology**
The study of drugs and how they interact with the cell at a molecular level. Designed for professionals working in pharmaceutical or biotechnology fields (the interaction between drug or neurotransmitter and receptor, the interaction between receptor and cell, and the relationship between receptors and drug design. In addition to the role of recombinant DNA technology and its use within the field).

**MCD2 - Drug design development & discovery**
The general principles and current approaches involved in modern drug discovery and development, with an emphasis on basic concepts in drug action, delivery and metabolism. Also novel drug discovery techniques and emerging non-standard therapeutics is studied.

**MCC2 – Chromatography**

To provide the students with a comprehensive theoretical background for the most useful and modern chromatographic methods and techniques. In addition, some useful recent applications are also discussed.

**Elective courses:**

**MCE1 - Good Dispensing Practice & Pharmacotherapy**

Provides the fundamentals of good dispensing practice to enable you to read and interpret prescriptions, to prepare and pack medicine in accordance with prescriptions within the legal requirements of pharmacy law. It also covers the theory of common diseases and the use of drugs to treat these diseases. Patient counseling and OTC product counseling will also be taught.

**MCE2 - Applied Immunology**

This subject covers the immunopathology and immunological techniques used in screening, diagnosis and monitoring of diseases. It also deals with the way in which our immune system is manipulated for prevention and treatment of diseases through immunization, immune suppression and immune modulation.

**MCE3 - Blood Banking**

This subject provides the basic knowledge of blood banking and covers the theoretical, practical and clinical aspects of blood transfusion. There is emphasis on the application of immunologic principles as applied to blood grouping, tissue typing and compatibility testing. It also stresses the importance of laboratory quality control and clinical considerations in transfusion practices.

**MCE4 - Occupational Safety & Health**

Covers health issues and safety at the workplace. The section on health examines the causes of occupational diseases and their respective controls (heat stress/strain, ventilation, noise and industrial lighting). The section on safety explores topics like machinery safety, electrical safety, hazards of fire and explosion, housekeeping and material handling, personal protection equipment and legislation concerning occupational safety and health.

**MCE5 - Biopharmaceutical Unit Operations**

This subject emphasises the application of engineering principles in the unit operations commonly employed in the upstream, pharmaceutical industry. Topics covered include reagent handling, dissolution, extraction, distillation, crystallisation, filtration and drying. It also covers the various fractionation processes and mechanical operations including solids handling, sieving, milling and comminution. Commonly used equipment in pharmaceutical manufacturing is also introduced.

**MCE6 - Biosensors**

The interaction between the analyte in its native environment, the biochemical systems employed to measure the analyte and the physical transducers used to convert this information into electrical signals.

**MCE7 - Nutrigenomics / Nutrigenetics**
Fundamentals as how the macronutrients; fat, carbohydrates and protein act to regulate gene expression (nutrigenetics) and how an individual's genotype may alter an individual's macronutrient requirements (nutrigenetics) and influence phenotype with respect to chronic disease and human health.

**MCE8 - Communication skills**
Provide the necessary skills to understand and apply the theories and principles of communication to ensure that the message they wish to convey is communicated effectively, as well as understand the cultural considerations in communication.

**MCE9 - Process Control & Instrumentation**
Introduce the basic concepts and principles of process control and instrumentation in chemical process industries. Current journals are used to highlight the latest advancement in process control and instrumentation technologies. Topics include process measuring instruments, basic concept of process control and open and closed-loop control systems. In addition, application of control systems in different aspects of chemical processes is covered.

**MCE10 - Fundamentals of ISO 15189**
Equip the candidates with all essential fundamentals in how to implement a quality management in a lab, provide the knowledge of the major managerial and technical requirements for lab accreditation, increase the skills of the good laboratory practices.