1. **Name of Course/Module**: Introductory course in Pharmacology  
2. **Course Code**: HPC 2019  
3. **Status of Subject**: Core for B. Sc Medical information technology  
4. **MQF Level/Stage**: Bachelor Degree – MQF Level 6  
5. **Version** (state the date of the last Senate approval): August 2011  
6. **Requirement for Registration**: HAP1019 Anatomy and Physiology of the Major Organ Systems  
   HBC1029 Biochemistry 2  
7. **Name(s) of academic/teaching staff**: Dr Margaret A Seldon  
   Ms Tan Chai Hong  
8. **Semester and Year offered**: Trimester 1 (Gamma level)  
9. **Objective of the course/module in the programme**: To introduce the principles of pharmacology with focus on the metabolism, distribution and the mechanism of drug action  
10. **Learning Outcomes**: At the completion of the subject, students should be able to:  
    1. Describe how drugs are absorbed, distributed, metabolized and eliminated (cognitive, level 2)  
    2. Understand the principles of drug action at the cellular level (cognitive, level 4)  
    3. Understand the effects of drugs on body systems (Cognitive, level 4)  
    4. Understand the method of computer aided drug design (Cognitive, Level 3)  
11. **Synopsis**: The course will introduce students to the principles of drug action. Students will be exposed to the action of drugs at various drug targets (Receptors, Enzymes, and Ion Channels), the routes of administration of drugs, the absorption and distribution, the metabolism and elimination and the factors that influence individual response to drug. The laboratory sessions will cover various aspects of computer aided drug design.  
12. **Mapping of Subject to Programme Outcomes**:  

<table>
<thead>
<tr>
<th>Programme Outcomes</th>
<th>% of Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO1: Apply soft skills in work and career related activities</td>
<td>50</td>
</tr>
<tr>
<td>PO2: Demonstrate knowledge and understanding of fundamental concepts, principles and best practices</td>
<td>50</td>
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</table>
### 13. Assessment Methods and Types:

<table>
<thead>
<tr>
<th>Method and Type</th>
<th>Description/Details</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Test</td>
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<td>20%</td>
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<tr>
<td>Assignment</td>
<td>Report &amp; Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td></td>
<td>50%</td>
</tr>
<tr>
<td>Quiz</td>
<td></td>
<td>10%</td>
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<tr>
<td>Lab report</td>
<td></td>
<td>10%</td>
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</table>

### 14. Details of Subject

<table>
<thead>
<tr>
<th>Topics</th>
<th>Mode of Delivery</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lecture</td>
</tr>
<tr>
<td>1. <strong>Introduction</strong> – Overview, Nomenclature and Classification of Drugs</td>
<td>1</td>
</tr>
</tbody>
</table>
| 2. **General Principles of Drug Action:**  
  - The binding of drug molecules to cells  
  - Desensitization and tachyphylaxis | 1 |
| 3. **How Drugs Act: Molecular Aspects**  
  - Targets for drug action  
  - Receptors  
  - Ion channels  
  - Enzymes  
  - Nucleic acids | 4 |
| 4. **Cellular Mechanisms: Excitation, Contraction and Secretion**  
  - Regulation of Intracellular calcium levels  
  - Excitation  
  - Muscle contraction  
  - Release of chemical mediators  
  - Epithelial ion transport | 2 |
| 5. **Cellular Mechanism: Cell Proliferation, and Apoptosis**  
  - Cell proliferation  
  - Angiogenesis  
  - Apoptosis and cell removal  
  - Pathophysiological implications  
  - Therapeutic implications | 2 | 1 |
| 6. **Absorption and Distribution of Drugs**  
  - Translocation of drug molecules  
  - Drug disposition  
  - Drug absorption  
  - Special drug delivery systems  
  - Concept of Volume of Distribution, Clearance and $T_{1/2}$ | 3 |
| 7. **Drug Metabolism, Elimination, Pharmacokinetics & Pharmacodynamics**  
  - Drug metabolism  
  - Renal excretion of drugs and drug metabolites  
  - Biliary excretion and enterohepatic circulation | 3 | 1 |
| 8. **Factors that Influence the Patient Response to a Drug**  
  Adverse Drug Reactions | 1 |
9. **Chemical Mediators** and the
   - Autonomic Nervous System
   - Cholinergic Transmission
   - Noradrenergic Transmission

10. **Chemical Mediators:**
    - Other Peripheral Mediators
    - Peptides and Proteins as Mediators
    - Nitric Oxide
    - Local Hormones, Inflammation, and Immune Reactions
    - Anti Inflammatory and Immunosuppressant Drugs

11. **Action of Drugs on specific Organ Systems**
    - Cardiovascular, Renal

12. **Methods and Measurement in Pharmacology**
    - Bioassay
    - Animal models of disease
    - Clinical trials
    - Balancing benefits and risks

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<thead>
<tr>
<th>Total</th>
<th>28</th>
<th>3</th>
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</thead>
</table>

15. **Laboratory**
   - Introduction
   - Experimental Techniques and Data Analysis
   - Computer aided drug design – virtual high throughput screening
   - Computer aided drug design – sequence analysis
   - Computer aided drug design – homology modelling
   - Computer aided drug design – similarity searches
   - Computer aided drug design – drug lead optimization
   - Computer aided drug design – physicochemical modelling
   - Computer aided drug design – drug bioavailability and bioreactivity

16. **Total Student Learning Time (SLT)**

<table>
<thead>
<tr>
<th>Total Guided and Independent Learning</th>
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</thead>
<tbody>
<tr>
<td>Face to Face (Hours)</td>
</tr>
<tr>
<td>Total SLT</td>
</tr>
</tbody>
</table>

17. **Credit Value**

| 3 |
18. Reading Materials:

<table>
<thead>
<tr>
<th>Textbook</th>
<th>Reference Materials</th>
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</thead>
</table>

19. Appendix (to be compiled when submitting the complete syllabus for the programme):

1. Mission and Vision of the University and Faculty
2. Mapping of Programme Objectives to Vision and Mission of Faculty and University
3. Mapping of Programme Outcome to Programme Objectives
4. Programme Objective and Outcomes (Measurement and Descriptions)