**Ph.D. Program in Pharmacology**

**Expected Learning Outcomes (ELOs)**

**ELO1** Analyze and apply knowledge in pharmacology and related fields

**ELO2** Integrate knowledge to hypothesize, design, perform, analyze and criticize research work and publish in international journal

**ELO3** Demonstrate ethical and social responsibility comply with applicable laws and
 regulations

**ELO4** Work effectively and express appropriate roles, both as a leader and a team member, with an ability to perform multitask function with cultural sensitivity

**ELO5** Transfer knowledge and research work to academic community and general public

Participate in life-long learning and keep up-to-date with emerging knowledge and technologies

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| **Specific skill** | **Generic skill** | **Knowledge** |
| **SS1** Explain basic concept in pharmacology and integrate knowledge to related fields | **GS1** Language and communicationskills (listening, speaking, reading, writing) | **K1** Pharmacokinetics/pharmacodynamics |
| **K2** Molecular and cellular science |
| **SS2** Compare normal physiology and pathophysiology of disease and apply knowledge to identify the targets of drug action | **GS2** Working with others | **K3** Physiology and pathology  |
| **GS3** Information technology skills | **K4** Systemic pharmacology |
| **GS4** Professional ethics | **K5** Molecular pharmacology |
| **GS5** Research skills | **K6** Professional ethics (biosafety,chemical safety, animal safetyand human ethics) |
| **GS6** Leadership and managementskills |
| **SS3** Apply the knowledge of mechanism of drug action and principle in using drugs |
| **GS7** Problem solving | **K7** Biostatistics |
| **GS8** Moral and integrity | **K8** Research methodology |
| **SS4** Apply pharmacology knowledge  to identify novel drug targets |  | **K9** Literature review |
| **K10** Instrumentation |
| **SS5** Develop research questions and research plans | **K11** Plagiarism |
|  |
| **SS6** Design and perform experiments |
| **SS7** Analyze, interpret and evaluate research results |
| **SS8** Produce research article ininternational journals |
| **SS9** Create innovative idea |

**Curriculum Mapping (CM)**

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| **Course** | **ELO1** | **ELO2** | **ELO3** | **ELO4** | **ELO5** |
| **Core course** |
| **SCPM 501** |  | SS5,SS7,GS1-3K8,K10I | GS8 |  |  |
| **SCPM 502** | SS1GS1,GS3K1-3,K5E |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 511** | SS1GS1,GS3K2I |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 512** | SS2 GS1,GS3K3I |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 521** | SS1-3GS1,GS3K1-5M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 522** | SS1-3 GS1,GS3K1-5M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 612** | SS1-4 GS1,GS3K1-5M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 616** | SS3GS1,GS3,GS4I | SS5-7GS1,GS3,GS5K7-9I | GS1,GS3,GS8 | GS1,2,6 |  |
| **Course** | **ELO1** | **ELO2** | **ELO3** | **ELO4** | **ELO5** |
| **SCPM 682** | SS1-3GS1-4K1-5E | SS3-4,7GS1-6K1-10E | GS1,GS3,GS8K11 | GS1,2,6 | SS3-4,7GS1-6K1-11I |
| **Elective course**  | GS1-4K2 | SS7GS1-6K2,6-10I-E | GS1,GS3,GS8 | GS1,2,6 |  |
| **Qualifying exam** | SS1-4GS1-4K1-5A | SS1-7GS1-5K1-10A | GS1,GS3,GS8K6,11 |  | SS1-4,7GS1-6K1-11M |
| **Thesis** | SS1-4GS1-4K1-5A | SS1-9GS1-7K1-10A | GS1-8K6,11A | GS1,2,6,7M | SS1-9GS1-8K1-11A |

I = Introduced

E = Emphasized

M = Mastered

A = Assessed