**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 communication skills (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 safety  and human ethics) |
| **GS6** Leadership and management  skills |
| **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 in international journals |
| **SS9** Create innovative idea |

**Curriculum Mapping (CM)**

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| **Course** | **ELO1** | **ELO2** | **ELO3** | **ELO4** | **ELO5** |
| **Core course** | | | | | |
| **SCPM 501** |  | SS5,SS7,  GS1-3  K8,K10  I | GS8 |  |  |
| **SCPM 502** | SS1  GS1,GS3  K1-3,K5  E |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 511** | SS1  GS1,GS3  K2  I |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 512** | SS2  GS1,GS3  K3  I |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 521** | SS1-3  GS1,GS3  K1-5  M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 522** | SS1-3  GS1,GS3  K1-5  M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 612** | SS1-4  GS1,GS3  K1-5  M |  | GS1,GS3,GS8 | GS1,2,6 |  |
| **SCPM 616** | SS3  GS1,GS3,GS4  I | SS5-7  GS1,GS3,GS5  K7-9  I | GS1,GS3,GS8 | GS1,2,6 |  |
| **Course** | **ELO1** | **ELO2** | **ELO3** | **ELO4** | **ELO5** |
| **SCPM 682** | SS1-3  GS1-4  K1-5  E | SS3-4,7  GS1-6  K1-10  E | GS1,GS3,GS8  K11 | GS1,2,6 | SS3-4,7  GS1-6  K1-11  I |
| **Elective course** | GS1-4  K2 | SS7  GS1-6  K2,6-10  I-E | GS1,GS3,GS8 | GS1,2,6 |  |
| **Qualifying exam** | SS1-4  GS1-4  K1-5  A | SS1-7  GS1-5  K1-10  A | GS1,GS3,GS8  K6,11 |  | SS1-4,7  GS1-6  K1-11  M |
| **Thesis** | SS1-4  GS1-4  K1-5  A | SS1-9  GS1-7  K1-10  A | GS1-8  K6,11  A | GS1,2,6,7  M | SS1-9  GS1-8  K1-11  A |

I = Introduced

E = Emphasized

M = Mastered

A = Assessed