

**SCPA 605: Essential Pathobiology
Year 2018**

**Department of Pathobiology
Mahidol University**

Course Syllabus

(Lecture-Lab-Self-study)

SCPA 605 Essential Pathobiology

2(1-2-3)

Histopathological techniques for routine work in pathology; Tissue collection and preparation, paraffin embedding technique, basic tissue staining; Modified techniques for research, frozen staining, immunological staining, photomicrography

Prerequisite	None
Session	2 nd Semester
Course Conditions	class size: None

Course Objectives

At the completion of the course, students should be able to:

1. Describe and practice experimental study of research in Pathobiology
2. Describe and practice advance techniques for research in Pathobiology
3. Describe and can be analyze imaging techniques for research
4. Describe and can be select appropriate statistical analysis for research
5. Can be write and present scientific proposal for research in Pathobiology

Course Outline

Date	Time	Topic	Lecture & Discussion	Lab	Lecturer
Fri 15 Feb	9.00-10.00	Introduction (Syllabus, objective & examination)			WP
		Proposal design for pathobiological research	L1		WP
		1. Experimental study of research			
Fri 15 Feb	10.00-11.00	Application of histopathology for research	L2		PS
	11.00-12.00	Lab 1 : Application of histopathology for research		1	
Mon 18 Feb	9.00-10.00	In vitro models in pathobiology	L3		WP
	10.00-11.00	Lab 2 : In vitro models in pathobiology		1	ANJ
	13.00-14.00	Model organisms	L4		
	14.00-15.00	Lab 3 : Model organisms		1	
Wed 20 Feb	9.00-11.00	Clinico pathological test	L5-6		SN
	11.00-12.00	Lab 4 : Clinico pathological test		1	NK
	13.00-15.00	Animal models for disease	L7-8		
	15.00-16.00	Lab 5 : Animal models for disease		1	
Mon 25 Feb	9.00-12.00	Examination L2-L8		3	WP
		2. Advance technology for research			
Wed 27 Feb	9.00-10.00	Advance fluorescence techniques	L9		PC
	13.00-16.00	Lab 7 : Advance fluorescence techniques		3	
Fri 1 Mar	9.00-10.00	Toxicopathology	L10		WJ
	13.00-16.00	Lab 8 : Toxicopathology (Pr210)		3	
Mon 4 Mar	9.00-10.00	Image analysis	L11		NC
	10.00-11.00	Genome editing techniques	L12		YN
Wed 6 Mar	9.00-12.00	Lab 9 : Image analysis		3	NC
	13.00-16.00	Lab 10 : Genome editing techniques		3	YN
Wed 13 Mar	9.00-10.00	Statistical Analysis for Pathobiology	L13		PC
	10.00-12.00	Lab Statistical Analysis for Pathobiology		4	
	13.00-15.00				
Wed 20 Mar	9.00-11.00	Molecular pathology	L14-15		ANJ
	13.00-16.00	Lab 6 : Molecular pathology (Rama)		3	Dr.Budsaba*
Wed 27 Mar	13.00-16.00	Examination L9-L15		3	WP
		Total	15	30	

Teaching methods

1. Lectures in class 15 hours.
2. Students design proposal and carry out experiments in laboratory session 30 hours.

Teaching Media

1. Class handouts, Powerpoint presentation, Publications

Measurement and Evaluation of Students Achievement

1. Examination 40%
2. Proposal report 30%
3. Discussion, and interactive performance in lecture and laboratory 20%
4. Attendance 10%
5. Student Examination Grade = A, B+, B, C+, C, D+, D, F

Course Evaluation

1. Students gain knowledge according to the course objectives.
2. Students give written course evaluation at the end of the course.
3. Evaluate students' satisfaction towards teaching and learning of the course using a questionnaire.
4. The lecturer will be notified with the result of the course evaluation from students to further improve the lecturing process.

Reference

Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, fourth edition, SAGE, 2014

Instructors

1. ANJ = Assistant Professor Amornrat Naranuntarat Jensen, Ph.D.
2. NC = Nisamanee Charoenchon, Ph.D.
3. NK = Niwat Kangwanrangsang, Ph.D.
4. PC = Assistant Professor Pornthip Chaichompoo, Ph.D.
5. PS = Associate Professor Prasit Suwannalert, Ph.D.
6. SN = Somphong Narkpinit, M.D.
7. WJ = Associate Professor Wannee Jiraungkoorskul, Ph.D.
8. WP = Witchuda Payuhakrit, Ph.D.
9. YN = Yaowarin Nakornpakdee, Ph.D.

Coordinator Witchuda Payuhakrit, Ph.D.

Department of Pathobiology, Faculty of Science, Mahidol University

Tel. 02-201-5572, E-mail: witchuda.pay@mahidol.ac.th

Lesson Plan

1. Topic	Proposal design for pathological research
2. Name Lecturer	Witchuda Payuhakrit
Education	Ph.D. (Pathobiology)
Position	Lecturer
Contact	02-201-5572, Email: witchuda.pay@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	15 February 2019, Time 9:00-10:00
6. Topic Objective	At the completion of this unit the student will be
	- Applied basic knowledge for research proposal writing
7. Topic Details	
	1. Introduction of research proposal 2. Contents of research proposal
8. Learning Methods	Lecture, Presentation, Group discussion
9. Teaching Media	Power point presentation, Handout, Text books, Publications
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Written examination
12. Date of Improvement	11 February 2019

Lesson Plan

1. Topic	Application of Histopathology for Research
2. Name Lecturer	Dr. Prasit Suwannalert
Education	Ph.D. (Pathobiology)
Position	Associate Professor
Contact	02-201-5558, Email: prakit.suw@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	15 February 2019, Time 10.00 - 12.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Describe the principles of histopathological techniques and their applications 2. Discuss the application of histopathology for research
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Histopathological techniques and their applications 2. Application of histopathology for research
8. Learning Methods	Lecture, Laboratory, Discussion and Self study
9. Teaching Media	PPT, Handout, Text book, Glass slides of histopathology
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Short answer questions
12. Date of Improvement	1 February 2019

Lesson Plan

1. Topic	<i>In vitro</i> Models in Pathobiology
2. Name Lecturer	Witchuda Payuhakrit
Education	Ph.D. (Pathobiology)
Position	Lecturer
Contact	02-201-5572, Email: witchuda.pay@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	18 February 2019, Time 09.00 - 10.00
6. Topic Objective	At the completion of this unit the student will be
	<ol style="list-style-type: none"> 1. Describe the advantages and limitations of <i>in vitro</i> models 2. Classify types of <i>in vitro</i> models 3. Describe biology of cultured cells 4. Can be applied <i>in vitro</i> models in proposal writing
7. Topic Details	
	<ol style="list-style-type: none"> 1. Introduction of <i>in vitro</i> model 2. Classification of <i>in vitro</i> models 3. Biology of cultured cells 4. Equipment, media and other concerns in <i>in vitro</i> models
8. Learning Methods	Lecture, Presentation, Group discussion
9. Teaching Media	Power point presentation, Handout, Text books, Publications
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Written examination
12. Date of Improvement	11 February 2019

Lesson Plan

1. Topic	Model organisms
2. Name Lecturer	Amornrat Naranuntarat Jensen
Education	Ph.D. (Toxicology)
Position	Assistant Professor
Contact	02-201-5579, amornrat.nar@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 18, 2019: , Time 13.00 - 15.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Compare the advantages and drawbacks of research using model organisms versus non-model organisms 2. Select appropriate model organisms for particular research studies
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Definition of model organisms 2. Examples of model organisms including yeast <i>Saccharomyces cerevisiae</i>, worm <i>Caenorhabditis elegans</i>, zebrafish <i>Danio rerio</i> 3. The advantages and disadvantages of utilizing each particular model organism in research
8. Learning Methods	Lecture and Self study
9. Teaching Media	Handout and Text book
10. Teaching Equipment	Computer and LCD
11. Examination and Evaluation	Take-home assignment
12. Date of Improvement	February 8, 2019

Lesson Plan

1. Topic	Clinico Pathological Test
2. Name Lecturer	Somphong Narkpinit
Education	M.D.
Position	Lecturer
Contact	Email: somphong.nar@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 20, 2019, Time 10.00 - 12.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Explain the pathomechanisms of allergic contact dermatitis 2. Explain the principles of allergy test: skin patch test, skin prick test and the others 3. Describe the results of skin patch and their pitfalls
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Pathomechanisms of allergic contact dermatitis 2. Principles of allergy test: skin patch skin, skin prick test and the others 3. The interpretation of allergic patch test
8. Learning Methods	Presentation Lecture and Laboratory
9. Teaching Media	Power point presentation
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Examination
12. Date of Improvement	February 14, 2019

Lesson Plan

1. Topic	Animal models for diseases
2. Name Lecturer	Niwat Kangwanrangsan
Education	Ph.D. (Medical Sciences)
Position	Lecturer
Contact	02-201-5576, Email: niwat.kan@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA 605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 20, 2019, Time 13.00 - 16.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Understand the important of animal models in scientific researches 2. Describe how to choose the suitable model for biomedical science researches 3. Explain the ethical and practical issues in using laboratory animals
7. Topic Details	
	<ol style="list-style-type: none"> 1. Important of animal models in scientific research 2. Various types of animal models 3. The criteria to choose the animal models for research 4. Use of laboratory animals
8. Learning Methods	Lecture and discussion
9. Teaching Media	Power point presentation, Handout, Text books, Publications
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Written examination and participation in class
12. Date of Improvement	14 February 2019

Lesson Plan

1. Topic	Molecular pathology
2. Name Lecturer	Amornrat Naranuntarat Jensen
Education	Ph.D. (Toxicology)
Position	Assistant Professor
Contact	02-201-5579, amornrat.nar@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 25, 2019, Time 09.00 - 11.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Describe the principles of molecular techniques frequently used in pathology 2. Select appropriate molecular techniques to applied for various research problems
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Extraction of nucleic acids 2. Nucleic acid amplification techniques 3. Molecular hybridization 4. Techniques used in mutation detection 5. Fluorescent in situ hybridization 6. Spectral karyotyping 7. Microarray technology
8. Learning Methods	Lecture and Self study
9. Teaching Media	Handout and Text book
10. Teaching Equipment	Computer and LCD
11. Examination and Evaluation	Short-answer/ essay questions
12. Date of Improvement	February 8, 2019

Lesson Plan

1. Topic	Advance fluorescence techniques
2. Name Lecturer	Pornthip Chaichompoo
Education	Ph.D. (Immunology)
Position	Associate Professor
Contact	E-mail: pornthip.chh@mahidol.ac.th
3. Course	Essential pathobiology (SCPA 605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 27, 2019, Time 09.00 - 10.00 a.m., 01.00 - 04.00 p.m.
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Describe principle and protocol for immunofluorescent staining 2. Describe principle of fluorescent microscopy, confocal microscopy and flow cytometer 3. Apply immunofluorescent technique for scientific research
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Principle, protocol and troubleshoots for immunofluorescent techniques 2. Principle and instruction of fluorescent microscopy, confocal microscopy and flow cytometer 3. Application of immunofluorescent technique for scientific research
8. Learning Methods	Lecture and practice for immunofluorescent technique
9. Teaching Media	Power point presentation, Handout, Text book, Reagents and Equipment for practice on immunofluorescent technique
10. Teaching Equipment	Computer, LCD, materials for practice on immunofluorescent technique, fluorescent microscopy, confocal microscopy, flow cytometer
11. Examination and Evaluation	Assay Examination
12. Date of Improvement	January 6, 2019

Lesson Plan

1. Topic	Toxicopathology
2. Name Lecturer	Dr. Wannee Jiraungkoorskul
Education	Ph.D. (Biology)
Position	Associate Professor
Contact	02-201-5571, Email: wannee.jir@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	February 25, 2019, Time 09.00 - 10.00 , 13.00 - 16.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Describe the definition, route of exposure, mechanisms of toxicity, and factors affecting toxicity of chemicals. 2. Describe the type of toxicity study.
7. Topic Detail	
	Definition, Route of exposure, Mechanisms of Toxicity, Factors affecting, Type of toxicity study
8. Learning Methods	Lecture, Discussion, and Self study
9. Teaching Media	PPT, Handout, Text book, Research article
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Short answer questions, Class participation
12. Date of Improvement	11 February 2019

Lesson Plan

1. Topic	Image Analysis
2. Name Lecturer	Dr. Nisamanee Charoenchon
Education	Ph.D. (Medicines)
Position	Lecturer
Contact	02-201-5573, Email: nisamanee.cha@mahidol.ac.th
3. Course	Essential Pathobiology (SCPA605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	4 March 2019, Time 9.00 - 10.00 am; 6 March 2019, Time 9.00 - 12.00 am
6. Topic Objective	At the completion of this unit the student will be able to
	1. Describe the principles of image analysis for pathological research 2. Discuss and apply the application of image analysis for pathological research
7. Topic Detail	
	1. Image analysis techniques and their applications 2. Application of image analysis for research
8. Learning Methods	Lecture, Laboratory, Discussion and Self study
9. Teaching Media	PPT, Handout, Text book, Glass slides of histopathology
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	Short answer questions
12. Date of Improvement	11 February 2019

Lesson Plan

1. Topic	Genome editing techniques
2. Name Lecturer Education Position Contact	Dr. Yaowarin Nakornpakdee Ph.D. (Medical Microbiology) Lecturer 02-201-5578, Email: yaowarin-arin@hotmail.com
3. Course	Essential Pathobiology (SCPA 605)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	4 March 2019, 11.00-12.00 and 6 March 2019, 13.00-16.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ol style="list-style-type: none"> 1. Describe the process of gene editing and its application 2. Describe the advantages and disadvantages of gene editing
7. Topic Detail	
	<ol style="list-style-type: none"> 1. Introduction to gene editing 2. Processes of gene editing 3. Application of gene editing 4. Advantages and disadvantages of gene editing
8. Learning Methods	Lecture, Group discussion and Self study
9. Teaching Media	Power Point, Handout, Text book
10. Teaching Equipment	Computer, LCD
11. Examination and Evaluation	In-class participation and written examination
12. Date of Improvement	8 February 2019

Lesson Plan

1. Topic	Statistical Analysis for Pathobiology
2. Name Lecturer	Pornthip Chaichompoo
Education	Ph.D. (Immunology)
Position	Associate Professor
Contact	E-mail: pornthip.chh@mahidol.ac.th
3. Course	Essential pathobiology (SCPA 605) 2(1-2-3)
4. Programme Title	M.Sc. and Ph.D. in Pathobiology
5. Date and Time	March 13, 2019, Time 09.00 - 12.00 and 13.00 – 15.00
6. Topic Objective	At the completion of this unit the student will be able to
	<ul style="list-style-type: none"> 4. Classified nominal and ordinal scales in statistical analysis 5. Calculate the sample size for experimental design in scientific research 6. Analysis of parametric and nonparametric statistics for scientific data 7. Analysis of odd ratio 8. Analysis of parametric and nonparametric statistics for correlation 9. Analyze scientific data by SPSS, GraphPad Prism and G* software
7. Topic Detail	
	<ul style="list-style-type: none"> 4. Nominal and ordinal scales in statistical analysis 5. The sample size for experimental design in scientific research 6. Analysis of parametric and nonparametric statistics for scientific data 7. Odd ratio 8. Analysis of parametric and nonparametric statistics for correlation 9. Demonstrate SPSS, GraphPad Prism and G* software for statistical analysis
8. Learning Methods	Lecture and computer with SPSS, GraphPad Prism and G* software
9. Teaching Media	Power point presentation, Handout, Text book, computer with SPSS, GraphPad Prism and G* software
10. Teaching Equipment	Computer with SPSS, GraphPad Prism and G* software and LCD
11. Examination and Evaluation	Assay Examination
12. Date of Improvement	January 6, 2019