

**Course Syllabus**  
**MBNS 659 Microtechniques in Neuroscience Research**  
**Academic Year 2024**

**Course ID and Name:** MBNS 695 Microtechniques in neuroscience research

**Course coordinator:** Assoc. Prof. Dr. Sujira Mukda

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Email: sujira.muk@mahidol.edu

**Instructors:**

1. Assoc. Prof. Dr. Sujira Mukda
2. Asst. Prof. Dr. Narisorn Kitiyanant
3. Asst. Prof. Dr. Kittikun Viwatpinyo
4. Asst. Prof. Dr. Jiraporn Panmanee
5. Dr. Ekkaphot Khongkla

**Supporting Staff:**

1. Ms. Kanda Putthaphongpheuk
2. Ms. Kornkanok Promthep
3. Ms. Somsong Phengsukdaeng
4. Ms. Sasithorn Prommet

**Credits:** 1 (0-2-1)

**Curriculum:** Master of Science Program in Neuroscience (elective course)

**Semester offering:** Second semester

**Pre-requisites:** None

**Course learning outcomes (CLOs)**

Upon completion of this course, students can:

1. Discuss ethical issues related to neuroscience research, demonstrating an understanding of moral responsibilities in scientific practice (aligned with PLO1(P)).
2. Explain the process in production of quality microscopic slides from brain specimens for research in histopathology and in molecular biology (aligned with PLO2(P)).
3. Apply theoretical knowledge in establishing valid protocols and solving problems during production of microscopic slides (aligned with PLO3(R)).
4. Work effectively as part of a team, demonstrating leadership and collaborative skills in group projects (aligned with PLO4(R)).
5. Evaluate and interpret experimental results using appropriate statistical methods and communicate findings clearly (aligned with PLO5(R)).

**Alignment of teaching and assessment methods to course learning outcome:**

Course learning outcome	Teaching method	Assessment method
(1) Discuss ethical issues related to neuroscience research, demonstrating an understanding of moral responsibilities in scientific practice.	(1) Lecture (2) In-class discussion (3) Laboratory hands-on practice	(1) Formative assessment (2) Assignments
(2) Explain the process in production of quality microscopic slides from brain specimens for research in histopathology and in molecular biology.	(1) Lecture (2) In-class discussion (3) Laboratory hands-on practical session	(1) Student presentation and evaluation of submitted microscopic slides (2) In-class discussion
(3) Apply theoretical knowledge in establishing valid protocols and solving problems during production of microscopic slides.	(1) Laboratory hands-on practical session (2) In-class discussion	(1) Student presentation and evaluation of submitted microscopic slides (2) In-class discussion
(4) Work effectively as part of a team, demonstrating leadership and collaborative skills in group projects.	(1) Laboratory hands-on practical session (2) Assignments (3) In-class discussion	(1) Performance in social skills (2) Assignments (3) In-class discussion
(5) Evaluate and interpret experimental results using appropriate statistical methods and communicate findings clearly.	(1) Laboratory hands-on practical session (2) In-class discussion	(1) Formative assessment (2) Student presentation and evaluation of submitted microscopic slides (3) In-class discussion

**Course description:**

Practical sessions of the paraffin method, cryosectioning and immunohistochemical techniques; the analyses and discussions of results

การฝึกปฏิบัติการเตรียมชิ้นเนื้อโดยเทคนิคพาราฟิน การตัดชิ้นเนื้อแช่แข็งและเทคนิคทางอิมมูโนฮิสโตเคมี การวิเคราะห์และอภิปรายผลงาน

**Course schedule:**

Date: Monday-Friday

Time: 09.30-16.30

Venue: Lecture: Room A401<sup>(1)</sup> Institute of Molecular Biosciences

Lab: Rooms D401-04<sup>(2)</sup> Institute of Molecular Biosciences

Rooms C413<sup>(3)</sup> Institute of Molecular Biosciences

## Course schedule

### MBNS 659 Microtechniques in Neuroscience Research

17 April 2025 – 24 April 2025 & 16 May 2025

Course Coordinator: Assoc. Prof. Sujira Mukda

Tel: 02-441-9003-7 ext. 1206, 1437

E-mail: [sujira.muk@mahidol.edu](mailto:sujira.muk@mahidol.edu)

	Date	Time	Topic	Lecturer
0	17 Apr 2025	09.00-09.30	<b>L0:</b> Course orientation	Sujira <sup>(1)</sup>
		09.30-10.00	<b>Pre-course L1:</b> Introduction to microtechnique in neuroscience research	Sujira <sup>(1)</sup>
		10.00-12.00	<b>Pre-course L2:</b> Theories and applications of microscopes	Narisorn <sup>(1)</sup>
1		13.00-16.00	<b>Lab1:</b> Tissue processing for cryosection & Cryosectioning	Sujira/Jiraporn <sup>(2)</sup>
2	18 Apr 2025	09.30-12.30	<b>Lab2:</b> Immunohistochemistry: Staining	Sujira/Jiraporn <sup>(2)</sup>
3		13.30-16.30	<b>Lab3:</b> Discussion: Applications of microtechniques in neuroscience research	Sujira <sup>(2)</sup>
4	21 Apr 2025	09.30-12.30	<b>Lab4:</b> Tissue processing by paraffin technique practice: Sample preparation	Kittikun <sup>(2)</sup>
5		13.30-16.30	<b>Lab5:</b> Tissue processing by paraffin technique practice: H&E staining	Kittikun <sup>(2)</sup>
6	22 Apr 2025	09.30-12.30	<b>Lab6:</b> Tissue processing by paraffin technique practice: Nissl staining	Kittikun <sup>(2)</sup>
7		13.30-16.30	<b>Lab7:</b> Photomicrography & Image analysis - Immunohistochemistry	Sujira/Jiraporn/ Narisorn
8	23 Apr 2025	09.30-12.30	<b>Lab8:</b> Sample preparation for Immunocytochemistry	Ekkaphot <sup>(3)</sup>
9		13.30-16.30	<b>Lab9:</b> Immunocytochemistry: Staining	Ekkaphot <sup>(3)</sup>
10	24 Apr 2025	09.30-12.30	<b>Lab10:</b> Photomicrography & Image analysis - Immunocytotochemistry	Ekkaphot
	xx May 2025	09.00-12.00	Student Presentation (join with MBNS 751 Research Methods in Cellular and Molecular Neuroscience, MBNS 752 Research Methodology in Cognitive Neuroscience & MBNS 658 Animal Experimentation in Neuroscience courses)	Teaching Staff

**Assessment criteria:**

Assessment criteria	Assessment method	Scoring rubrics
Laboratory performance and Slide submission/ Assignments (50%)	(1) Direct observation (2) Practical examination (3) In-class discussion	(1) Ability to follow procedure or to design a procedure for experiment. (2) Use of equipment. (3) Working area and safety. (4) Group work.
Participation in in-class discussion (20%)	(1) In-class discussion	(1) Performance in in-class discussion.
Presentation of assigned topic (20%)	(1) Short presentation	(1) Information quality and organization of topic presented. (2) Verbal and non-verbal communication and English proficiency. (3) Critical thinking. (4) Visual tools.
Class attendance (10%)	(1) Numbers of classes signed in	(1) Scoring directly from times of signing in.

Student's achievement will be graded using symbols: A, B+, B, C+, C, D+, D and F based on the criteria as follows:

Percentage	Grade
85 -100	A
80 – 84	B+
70 - 79	B
60 - 69	C+
50 - 59	C
45 - 49	D+
40 – 44	D
< 40	F

**ATTENTION**

*(1) According to the Faculty of Graduate Studies regulation, enrolled students are required to attend classed more than 80% of total class time. Students will be disqualified from examination if they failed to comply with this regulation.*

Date revised: 5 January 2025