MBNS 603: ADVANCED AND CONTEMPORARY NEUROBIOLOGY
FEBRUARY – MARCH 2011

Course Director: Dr. Naiphinich Kotchabhakdi, Email: scnkc@mahidol.ac.th
Course Coordinator: Dr. Sukonthar Ngampramuan, Email: stsukonthar@staff2.mahidol.ac.th
Course Coordinator: Dr. Vorasith Siripornpanich, Email: drvorasith@gmail.com

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Course Description:

Experimental studies of new and advanced approaches and methodological techniques in contemporary research on the analysis of the structural and functional organizations of the nervous system, mechanisms of neuronal function, neural communication, neural coding and integration for sensory information processing and organization of neural control of behaviour.

Course Objectives:

At the end of this course the students who are taking this course are expected to be able to;

1. Explain and discuss frontiers of neuroscience, various approaches and modern methodological techniques in contemporary research on the analysis of the structural, functional, chemical and molecular organizations of the nervous system.
2. Analyze and synthesize modern scientific and experimental approaches in the understanding various mechanisms for neuronal functions, neural communication, neural coding and integration for sensory information processing, and organization of neural control of movements and behaviour.
3. Demonstrate the practical knowledge and laboratory skills in the anatomical, physiological and neuro-chemical studies and/or identification of human brain and nervous system, and various experimental models for contemporary neuroscience researches.
4. Demonstrate the ability and skill in the process of student-centered learning processes in order to acquire and utilize scientific information from multimedia and world-wide-web Internet system.
5. Cultivate and develop an appreciation of the philosophy, which forms the scientific bases of modern neuro- and behavioural sciences.
6. Apply the understanding of this introductory information in further study and research on neuroscience.

Learning Experience:

1. Student-centered, self-study (reading) of assigned reading materials and browsing of suggested knowledge-based Internet Web-sites.
2. Attending of scheduled activities which can be lectures, focused topics or practical laboratories, and discussion group.
3. Problem-based learning by asking specific questions in the group discussion.
4. Laboratory practice and Computer Assisted Instruction (CAI)
5. Preparation and submission of laboratory reports, and term reports on selected topics.

Educational Media/References:

1. Assigned Reading References
2. Suggested Internet Web-sites
3. Computer Power-Points and Computer-assisted Instruction (CAI)

4. Video-tapes and CD ROM's
5. Experimental setups, equipment and laboratory animals
6. Brain images
7. Laboratory setups for EEG-Evoked potentials and Clinical Neurophysiology
8. Laboratory setup for advanced experiments

Evaluation:

1. Essay type questions (2 Exams x 30%) 60%
2. Laboratory and term Reports 30%
3. Class Attendance and participation in Group Discussion 10%

Grading System:

Final total score	85 to 100	A	GPA 4.0
	80 to 84	B+	GPA 3.5
	70 to 79	B	GPA 3.0
	60 to 69	C+	GPA 2.5
	50 to 59	C	GPA 2.0
	45 to 49	D+	GPA 1.5
	40 to 44	D	GPA 1.0

Final grade below "B" is unacceptable for this core course requirement, and will require a "Re-grading" or withdrawal from the study program.

Core Faculty members (NBBC):

Naiphinich Kotchabhakdi, Ph.D.
Piyarat Govitrapong, Ph.D.
Wipawan Thangnipon, Ph.D.
Banthit Chetsawang, Ph.D.
Nuanchan Jutapakdeekul, Ph.D.
Sukonthar Ngampramuan, Ph.D.
Vorasith Siripornpanich, M.D., Dip Board Ped., Dip. Sub-Board Ped. Neurology
Sujira Mukda, Ph.D.

Invited Visiting Professors and Guest Lecturers:

Professor Dr. Ole Petter Ottersen, **M.D., Ph.D.,**
President, University of Oslo, Oslo, Norway and
Center of Excellence for Molecular Biology and Neuroscience, Institute of Basic Medical Sciences, Faculty of Medicine, University of Oslo, Oslo, Norway

Assoc. Prof. Dr. Mahmood Amiry-Moghaddam, MD, PhD
Senior Scientist, Centre for Molecular Biology and Neuroscience, University of Oslo
Group leader of a subgroup at the Laboratory of Molecular Neuroscience (LMN):
Adjoint Associate Professor, Norwegian University of Life Sciences (UMB), Norway

Professor Dr. J Allan Hobson, M.D.
Sleep Research Laboratory, Department of Psychiatry, Harvard Medical School, Harvard University, Cambridge, Boston, Massachusetts, USA

Professor Dr. Sato Honma, Ph.D.
Department of Physiology, Hokkaido University Graduate School of Medicine,
Sapporo 060-8638, Japan

Professor Dr. Shigemi Mori, M.D., Ph.D.
Professor Emeritus, National Institutes for Physiological Sciences, Okazaki, Japan

Dr. Laddawan Karachot, Ph.D.
Former Research Specialist, Laboratory for Memory and Learning, RIKEN Brain Science Institute (BSI), RIKEN, Japan

Suggested Internet Websites:

1. Society for Neuroscience	http://www.sfn.org
2. International Brain Research Organization	http://www.ibro.org
3. J Neuroscience	http://www.jneurosci.org
4. Science	http://www.sciencemag.org
5. Scientific American	http://www.scientificamerican.com/
6. Trends in Neuroscience	http://tins.trends.com
7. Annual Review in Neuroscience	http://neuro.AnnualReviews.org/
8. National Institute of Drug Abuse (NIDA)	http://www.drugabuse.gov
9. National Institute on Alcohol Abuse and Alcoholism	http://www.niaaa.nih.gov/
10. Nobel Foundation	http://www.nobel.se/nobel/nobel-foundation
11. National Institute of Neurological Disorders and Stroke	http://www.ninds.nih.gov/
12. National Institute on Mental Health	http://www.nimh.nih.gov/
13. Harvard: The Whole Brain Atlas	http://www.med.harvard.edu/AANLIB/home.html
14. McConnell Brain Imaging Centre Montréal Neurological Institute, McGill University	http://www.bic.mni.mcgill.ca/
15. BioMedNet	http://www.bmn.com
16. Science Direct, Elsevier	http://www.sciencedirect.com
17. MEDLINE/PUBMED	http://www.ncbi.nih.org
18. Neuroscience On-line	http://www.neuroscion.com
19. Google	http://www.google.co.th
20. Scholar Google	http://www.scholar.google.com
21. Wikipedia	http://www.wikipedia.com
22. Frontiers in Neuroscience	http://frontiersin.org

TIME SCHEDULE FOR 2010

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PERIOD	DATE	TIME	TOPICS	TEACHING STAFF
1.	**7 FEB 2011**	09.00-11.00	Orientation & Course Organization Overview of Contemporary Neuroscience	NAIPHINICH
2.	**8 FEB 2011**	09.00-11.00	Contemporary Methods for Study of Neural Connectivity	NAIPHINICH
3.	**8 FEB 2011**	13.00-15.00	Laboratory: Tracer Techniques Laboratory: Fluorescent Labeling & Immunocytochemical Methods	NAIPHINICH
4.	**9 FEB 2011**	09.00-12.00	Advanced Topics on Neuronal Genome, Neuronal Gene Expression and Alzheimer's disease	WIPAWAN
5.	**9 FEB 2011**	13.00-16.00	Advanced Topics on Neuronal Development	NUANCHAN
6.	**11 FEB 2011**	09.00-11.00	Analysis of Neuronal Morphology Golgi techniques, Intracellular Dye Injection, Lipophillic dyes, Green Fluorescence Proteins and Beyond: Quantitative Analysis of Neuronal Morphometry with Computer and Micro 3D Software	NAIPHINICH
		11.00–12.00	From Synapses to Glial Cells: Neuron – Glial Interactions in Health and Diseases and How hardwired is the Brain?	Video lecture OLE PETTER
7.	**14 FEB 2011**	09.00-10.00	Advanced Topic on Ion Channels	NAIPHINICH
		10.00-11.00	Patch-Clamping Technique	
		11.00-12.00	Aquaporin water channels In Health and Diseases	Video lecture MAHMOOD
8.	**15 FEB 2011**	09.00-12.00	Advanced Topics on Neuronal Communications: Intercellular Mediators and Signaling pathways	BANTHIT
9.	**15 FEB 2011**	13.00-16.00	Advanced Topics on Retina and Visual Information Processing	BANTHIT

PERIOD DATE	TIME	TOPICS	TEACHING STAFF
10. **16 FEB 2011**	09.00-10.00	Functional Organization of the CNS Neuro-imaging	VORASITH
	10.00-11.00	Imaging of the Living Brain Neuroimaging of Autism	VORASITH
	11.00-12.00	Laboratory: Imaging of the Brain Neuroimaging of Autism	VORASITH
11. **17 FEB 2011**	13.00-14.30	Advanced Topics on Pain And Pain Plasticity	VORASITH
	14.30-16.00	Advance Topics on Brain Plasticity	SUJIRA
21 FEBRUARY 2011	**09.00-16.00**	**MID-COURSE EVALUATION**	
12. **22 FEB 2011**	09.00- 10.00	Neural Mechanisms Generating sleep	Video Lecture HOBSON
	10.00-11.00	Functions and Molecular Genetics of Sleep	NAIPHINICH
	11.00-12.00	Advance Topics on Clock Genes Experiment on Clock Genes	Video Lecture SATO HONMA
13. **25 FEB 2011**	09.00-12.00	Advanced Topics on Neuroplasticity in Drug (Amphetamine) Addict	PIYARAT
14. **25 FEB 2011**	13.00-16.00	Advanced Topics on Neuronal Apoptosis and Regeneration	BANTHIT
15. **28 FEB 2011**	09.00-10.30	Advanced Topics on Neuro-Cardiology Brain-Heart Interaction	SUKONTHAR
	10.30-12.00	Advanced Topics on Hypothalamus	SUKONTHAR
16. **1 MAR 2011**	09.00-12.00	Advanced Topics on Neural Stem Cell	WIPAWAN
17. **2 MAR 2011**	09.00-11.00 11.00-12.00	Control of Voluntary Movement Control of Locomotion	NAIPHINICH Video Lecture SHIGEMI MORI

PERIOD	DATE	TIME	TOPICS	TEACHING STAFF
18.	**2 MAR 2011**	13.00-14.00	Advanced Research on Basal Ganglia	NAIPHINICH
		14.00-15.00	Advanced Research on the Cerebellum	LADDAWAN
19.	**4 MAR 2011**	09.00-11.00	Advanced Topics on Neuro-immunology	BANTHIT
20.	**4 MAR 2011**	13.00-15.00	Advanced Topics on Neuroendocrinology	SUJIRA
21.	**7 MAR 2011**	09.00-10.30	Research on Localization of Higher Brain Functions: Prefrontal Cortex Moral Reasoning, Judgment and Happiness	VORASITH
		10.30-12.00	The Social Brain and Autism Mirror Neuronal System	VORASITH
	11 MAR 2011	09.00-12.00	**FINAL EVAULATION**	
		13.00-16.00	**TERM PAPER AND REPORT and STUDENT PRESENTATION**	