

## NEUROTRANSMITTERS AND BEHAVIOUR

### (1) GENERAL

<b>SCHOOL</b>	HEALTH SCIENCES		
<b>DEPARTMENT</b>	DEPARTMENT OF BIOLOGICAL APPLICATIONS AND TECHNOLOGY		
<b>LEVEL OF STUDIES</b>	UNDERGRADUATE		
<b>COURSE CODE</b>	<b>BEE707</b>	<b>SEMESTER</b>	5 <sup>th</sup>
<b>COURSE TITLE</b>	NEUROTRANSMITTERS AND BEHAVIOUR		
<b>INDEPENDENT TEACHING ACTIVITIES</b> <i>In the case of credits being awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the entire course, give the weekly teaching hours and the total credits</i>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures		3	4
<b>COURSE TYPE</b> <i>general background, specialized background, specialised general knowledge, skills development</i>	Specialized background Skills development		
<b>PREREQUISITE COURSES:</b>			
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	Greek		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	Yes (in English language)		
<b>COURSE WEBSITE (URL)</b>	<a href="http://ecourse.uoi.gr/course/view.php?id=365">http://ecourse.uoi.gr/course/view.php?id=365</a>		

### (2) LEARNING OUTCOMES

<p><b>Learning Outcomes</b></p> <p><i>The learning outcomes of the course are described, the specific knowledge, skills and competences of an appropriate level that students will acquire after successfully completing the course.</i></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> <li>• <i>Description of the Level of Learning Outcomes for each course of study according to the European Higher Education Area Qualifications Framework</i></li> <li>• <i>Descriptive Indicators of Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning &amp; Appendix B</i></li> <li>• <i>Guidelines for Learning Outcomes writing</i></li> </ul>
<p>The students learn and comprehend the cellular mechanisms of behaviour, they can connect specific neurotransmitter substance actions to biological processes, they learn of the role of basic research and of the ensuing applications in finding new therapeutic and pharmacological approaches.</p> <p>The students learn how to combine information originating from basic (<i>in vitro, in vivo</i>) and clinical research, to compare and evaluate scientific findings, and as a consequence to be able to conclude about their validity.</p> <p>They familiarize with the design of scientific research through the selection, a result of student/teacher collaboration, of an appropriate topic for a bibliographic research project based on questions that were raised during the lectures or originated from the students themselves. The selection process results from the collaboration of the student with the teacher (one-to-one, personalized interaction).</p>

Moreover, through the implementation of this assignment, they acquire experience in written and/or oral presentations.

### **General Competences**

*Considering the general competencies that the graduate must have acquired (as listed in the Diploma Supplement and listed below), at which one (s) does the course aim?*

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for diversity and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Demonstration of social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision making
- Working independently
- Working in an international environment (all material used is in English)
- Working in an interdisciplinary environment
- Production of new research ideas
- Criticism and self-criticism

### **(3) COURSE SYLLABUS**

The “Neurotransmitters & Behaviour” course presents and analyzes current knowledge on the most well-described endogenous neurotransmitters and their exogenous analogues (composition, cellular action, receptor type and geography), as well as the current views on their effect on cerebral function and in general on behaviour, both in normal conditions and in CNS dysfunctions.

The course “Neurotransmitters & Behaviour” demands a specialized background, notably the basic knowledge acquired from the core course “Animal Physiology I” that describes the basic principles of Nervous System function. The new knowledge acquired here will focus on the mechanisms of action of neurotransmitter molecules and their subsequent role in the complex phenomenon of behavior.

#### Contents

1. Basic consideration of the role of neurotransmitters (neurotransmitter systems & brain function, cellular function control, neurotransmitter receptors, neurotransmitter release)
2. Neurotransmitters and synaptic function (Basic pharmacology and effect of exogenous substances, Acetylcholine, Dopamine, Noradrenaline, 5-Hydroxytryptamine (Serotonin), Stimulating amino acids, Inhibitory amino acids, Peptides, Other neurotransmitters)
3. Role of neurotransmitters in CNS dysfunctions (Study and modification of neurotransmitter effect in humans, Basic Ganglion Diseases, Epilepsies, Schizophrenia, Alzheimer's Disease, Anxiety, Depression, Pain and Analgesia)

4. Neurotransmitters and behaviour (Sleep and Alertness, Drug Dependence and Abuse)

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<p><b>DELIVERY</b> Face-to-face, Distance learning, etc.</p>	Face-to-face									
<p><b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b> <i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use of PowerPoint software Course information available on the electronic platform e-course Announcements on the course website Communication through e-mail correspondence</p>									
<p><b>TEACHING METHODS</b> <i>The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, projects, report writing, artistic creativity, etc.</i></p> <p><i>The student's study hours for each learning activity are given as well as the hours of non-guided study according to the ECTS principles.</i></p>	<table border="1"> <thead> <tr> <th><b>Activity</b></th> <th><b>Semester workload (study hours)</b></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td>70</td> </tr> <tr> <td>Preparation of an individual bibliographic study (project)</td> <td>30</td> </tr> <tr> <td>Course total</td> <td>100</td> </tr> </tbody> </table>		<b>Activity</b>	<b>Semester workload (study hours)</b>	Lectures	70	Preparation of an individual bibliographic study (project)	30	Course total	100
	<b>Activity</b>	<b>Semester workload (study hours)</b>								
	Lectures	70								
	Preparation of an individual bibliographic study (project)	30								
Course total	100									
<p><b>STUDENT PERFORMANCE EVALUATION</b> <i>Description of the evaluation procedure</i></p> <p><i>Language of evaluation, methods of evaluation, summative or formative, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, artistic interpretation, other.</i></p> <p><i>Specifically-defined evaluation criteria are stated, and if and where those are accessible to students.</i></p>	<p>I. Average score of three written tests examination (65%) that include: - Multiple-choice questions - Short-answer questions</p> <p>II. Preparation and presentation of an individual bibliographic study (35%)</p> <p><u>Evaluation criteria:</u> They are reported annually at the first lecture of the course and repeated during the course if necessary. They are also posted on the course page (e-course).</p>									

#### (5) SUGGESTED BIBLIOGRAPHY

- Suggested Bibliography:

- *Related scientific journals:*

Textbook. One of the following (free distribution)

3. Neuroscience of Behaviour, G. Panagis, Medical Pubs. Paschalides.
4. Neuroscience and Behaviour \*, E.R. Kandel., J. H. Schwartz & T.M. Jessel, University Publications of Crete (\* this book is very extensive in relation to the contents of the course).

Further bibliography is suggested (this is not distributed but the books are available from the University Library) also electronically,

1. Neurotransmitters, Drugs and Brain Function, Edited by RA Webster, Editions Wiley, 2001.
2. Molecular Neuropharmacology, A Foundation for Clinical Neuroscience, 2<sup>nd</sup> Ed., Nestler EJ, Hyman SE, Malenka RC, 2009, Editions McGraw-Hill, USA.
3. Molecular Neuropharmacology, Strategies and Methods, edited by Schousboe A and Brauner-Osborne H, 2004, Editions Humana Press.
4. Cellular and Molecular Neurophysiology, 3<sup>rd</sup> edition, C. Hammond, Academic Press 2008 (now Elsevier).

Educational Websites <http://ecourse.uoi.gr/course/view.php?id=365>)

Review papers available through the web.