

**MODULE APPROVAL FORM**  
**SECTION 1 – THE MODULE SPECIFICATION**

<b>1. Module title</b>	A2 Fundamental Neuroscience			
<b>2. Is this module also available for Study Abroad students</b>	<del>Yes</del>	No		
<b>3. Module code</b> <b>For King's students</b> <b>For Study Abroad students if different</b>	7PAMNNA2			
<b>4. Subject area</b>	Neuroscience, especially neurogenetics, developmental neurobiology, neuronal plasticity and neuroimmunology			
<b>5. Credit level (tick one box only)</b>	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input checked="" type="checkbox"/> 7√
<b>6. Credit value (tick one box only)</b>	<input type="checkbox"/> 15	<input checked="" type="checkbox"/> 30√	<input type="checkbox"/> 45	<input type="checkbox"/> 60
<b>M Level only</b>	<input type="checkbox"/> 20	<input type="checkbox"/> 40	<input type="checkbox"/> 90	
<b>7. Teaching institution (if not King's College)</b>				
<b>8. Proposing department</b>	Department of Neuroscience, Institute of Psychiatry			
<b>9. Module organiser and contact details</b>	Dr John Stephenson 020-7848-0374 <a href="mailto:john.stephenson@kcl.ac.uk">john.stephenson@kcl.ac.uk</a>			

**10. Educational aims of the module**

This compulsory module is one of three that together aim to introduce students to the subject areas that are considered fundamental to an MSc in Neuroscience, to develop their knowledge of them to level 7 and enable students to decide which aspects of neuroscience they wish to specialise in. The introductions are necessary because undergraduate degrees focus on a narrower range of disciplines (e.g. in physiology, biochemistry, or genetics, etc) than those encountered in post-graduate neuroscience.

The subject areas are:

- |                                       |                                 |
|---------------------------------------|---------------------------------|
| (i) neuroanatomy and neuropathology   | (ii) cell biology               |
| (iii) neurotransmission               | (iv) cell signalling            |
| (v) neurogenetics                     | (vi) developmental neurobiology |
| (vii) neuronal plasticity             | (viii) neuroimmunology          |
| (ix) systems neuroscience             | (x) addiction biology           |
| (xi) neuropsychology of mental health | (xii) neuroimaging              |
| (xiii) neurodegeneration              |                                 |

This module will concentrate, but not exclusively, on topics (v) to (viii). Together, the three modules aim to enable students to critically appraise the broad scientific literature relating to the above topics, and then to make an informed choice of a further taught module. Currently these modules are B (part-time students only) and B1 - B7 and then to carry out a closely supervised, research project (chosen from modules C and C1 - C7) and then to present the findings both orally and as a poster presentation.

### **11. Learning outcomes of the module (these need to take account of the generic level descriptors)**

Successful students will have an understanding of a broad range of neuroscience subject areas at level 7 that will enable them to understand and critically evaluate the neuroscience literature and to make an informed decision as to which area they wish to select for their specialisation (currently modules B and B1 – B7), research project (currently modules C and C1 - C7).

Thus after completing the subject areas in:

- the neuroanatomy/neuropathology section, students will, for example, be able to describe the general and specific arrangement of structures of the CNS, their inter-relationships and how CNS systems function. They will also be able to describe the main pathological features of a variety of neurodegenerative and neurodevelopmental diseases.
- the cell biology section, students will, for example, know the main cell-types of cells found in the CNS and their distinguishing features and the components and functions of the cellular compartments and organelles, e.g. the nucleus, ribosomes, cytoskeleton, cell adhesion and the properties of the cell membrane. They will also understand the stages of the cell cycle, cellular differentiation and the steps involved in gene expression, some of the ways a cell might regulate gene expression and the importance of gene expression to a cell.
- the neurotransmission and cell signalling sections, students will, for example, understand the molecular structures of ionotropic and metabotropic receptors, the mechanisms underlying neurotransmission, concepts of agonism, inverse agonism and antagonism, the mechanisms underlying the resting, synaptic and action potentials, and their role in neural integration. They will also understand the actions of tyrosine receptor kinases and steroid receptors; the interactions between metabotropic receptors and the different types of G proteins and adenylate cyclase. Involvement of G proteins and adenylate cyclase in signal transduction and the role of transcription factors.
- the neurodegeneration section, students will, for example, be able to describe the molecular and cellular mechanisms of neuronal cell death, with particular reference to Alzheimer's, Parkinson's, motor neurone, Batten and prion diseases; amyloid precursor and presenilins; the cytoskeleton and its involvement in neurodegeneration.
- the neurogenetics section, students will, for example, understand the principles of genetics and molecular evolution; behavioural genetics and epigenetics; animal models, genes and human personality; the genetics of psychiatric and other complex disorders and, the role of bioinformatics.
- the developmental neurobiology section, students will, for example, be able to describe the major events during neural development, the order in which they occur, and their relative interdependency. They will know examples of the different classes of molecules involved in these fundamental processes, including transcription factors, growth factors, receptors, signal transduction components, and extra-cellular matrix components and how these fundamental processes combine to the unified development of a neural system.
- the plasticity section, students will, for example, understand how cellular and molecular mechanisms can lead to changes in synaptic strength and are essential to mechanisms of learning and memory and how aberrant changes lead, for example to phantom limb pain and tinnitus
- the neuroimmunology section students will, for example, understand how the brain's immune system operates, viral diseases of the CNS, autoimmunity and hypersensitivity within the nervous system and multiple sclerosis.
- the systems neuroscience section, students will, for example, understand how neurones communicate, especially in mammalian brain, neural networks, the hypothalamic-pituitary axis and the organisation of motor and sensory neuronal circuitry.
- The addiction biology section, students will, for example, understand how behaviour is measured in laboratory animals, the utility of these in modelling psychiatric and neurological disorders and how genetic differences contribute to behavioural differences. They will also have knowledge of multidisciplinary approaches to the causes and mechanisms of drug dependence, and the pharmacology of drug-seeking behaviour.
- the neuroimaging section, students will understand the theoretical basis, methods of analysis, and the types and practical applications of magnetic resonance imaging (MRI) - structural, functional, diffusion tensor imaging, genetic fMRI, and other functional imaging methods, e.g., PET and SPECT.
- the clinical neuroscience section will, give students a clinical perspective of neurodegenerative diseases (Alzheimer's disease, motor neurone disease, Batten disease, etc) and of affective disorders, anxiety and schizophrenia and the relation between the neurobiology of these diseases and their symptoms.

They will also be able to critically appraise the scientific literature from each of the above subject areas, be able to integrate it and to apply it in their research.

**12. Programme details** (please list all the programmes to which the module contributes and state whether it is introductory (I), professional (P), core (Cr), compulsory (Cp), part of a core/compulsory pair (CrCp) or optional (O) for each programme. Where the module will form part of a core/compulsory pairing please state the partner module below.

Programme title	Programme code	I	P	Cr	Cp	CrCp	O
MSc Neuroscience					Cp		
MSc Neuroscience in Psychiatric Genetics					Cp		
MSc Neuroscience in Addiction Biology					Cp		
MSc Neuroscience in Developmental Neurobiology					Cp		
MSc Neuroscience in Neurodegeneration					Cp		
MSc Neuroscience in Neuroimaging					Cp		
MSc Neuroscience in Functional Neuroimaging and Tractography					Cp		
MSC Neuroscience in Cognitive Neuroscience							

CRCP's partner Module code	Module title	Programme title	Programme code

**13. Prohibited combinations** (please list all the modules which cannot be taken in combination with the proposed module and to which programme this relates)

Module title	Module code	Programme
None		

**14. Pre-requisites** (please list all the modules for which the proposed module is a pre-requisite)

Module title	Module code
B Neuroscience research	7PAMNNB1
C Neuroscience research project	7PAMNNC1
B1 Psychiatric Genetics research	7PAMNNB1A
C1 Research project in Psychiatric Genetics	7PAMNNB1B
B2 Addiction Biology research	7PAMNNB2
C2 Research project in Addiction Biology	7PAMNNC2
B3 Developmental Neurobiology research	7PAMNNB3
C3 Research project in Developmental Neurobiology	7PAMNNC3
B4 Neurodegeneration research	7PAMNNB4
C4 Research project in Neurodegeneration	7PAMNNC4
B5 Neuroimaging research	7PAMNNB5
C5 Research project in Neuroimaging	7PAMNNC5
B6 Functional Neuroimaging and Tractography research	7PAMNNC6
C6 Research project in Functional Neuroimaging and Tractography research	7PAMNNC6
B7 Cognitive Neuroscience research	7PAMNNB7
C7 Research project in Cognitive Neuroscience	7PAMNNC7

(and all the modules which are pre-requisite for the proposed module)	
Module title	Module code
None	

**15. Contact time/directed study** (please indicate the **exact number of hours for each activity** to give an overall picture of the workload a student taking the module would be expected to undertake. The student should be made clear of what they can expect regarding contact time with staff, and the expectation that the programme has of its students as independent learners). Apart from placements and self-guided learning it is expected that the others are all taught sessions.

Lectures	Seminar/ tutorials	Field/lab/studio /supervised learning	Project work	Placements	Self-guided learning
Approx 30-35	5	5			260

**If any of the above is related to e-learning please give details below:**

For their private study, students will listen/watch recordings of their lectures, and will access lecture handouts/recommended reading, etc, in an e-learning environment.

#### 16. Assessment pattern - For King's students

Method	Number/ amount	Duration / length	Pass Mark (40 for level 4, 5 and 6; 50 for level 7)	Mandatory mark/ Qualifying mark	% of final grade of module	SI set up if different
Unseen written examinations	1	2.5 h	50	No	60%	
Assessed coursework (please specify ie essay, project, seminar work, lab work)	1 essay	2000 words	50	No	40%	
Practical examinations						
Clinical examinations						
Oral examinations						
Dissertation						
Other (please specify)						
Other (where attendance/ completion is a requirement in order to pass but does not contribute a mark to the final grade)						

<b>16. Assessment pattern - For King's students</b>			
For KIS purposes, please note where the assessment falls under the following 3 categories (see guidance notes for explanation of categories):	Written	Coursework	Practical
Reassessment opportunity: please state the reassessment pattern, see regulation A3, 20.4 – 20.6			

<b>17. Assessment pattern - For Study Abroad students, if applicable</b>						
<b>Method</b>	<b>Number/ amount</b>	<b>Duration / length</b>	<b>Pass Mark (40 for level 4, 5 and 6; 50 for level 7)</b>	<b>Qualifying mark</b>	<b>% of final grade of modul e</b>	<b>SI set up if different</b>
Unseen written examinations						
Assessed coursework (please specify ie essay, project, seminar work, lab work)						
Practical examinations						
Clinical examinations						
Oral examinations						
Dissertation						
Other (please specify)						

17. Assessment pattern - For Study Abroad students, if applicable						
Method	Number/ amount	Duration / length	Pass Mark (40 for level 4, 5 and 6; 50 for level 7)	Qualifying mark	% of final grade of modul e	SI set up if different
Other (where attendance/ completion is a requirement in order to pass but does not contribute a mark to the final grade)						
For KIS purposes, please note where the assessment falls under the following 3 categories (see guidance notes for explanation of categories):	Written		Coursework		Practical	
Reassessment opportunity: please state the reassessment pattern, see regulation A3, 20.4 – 20.6						

**18. Examples of key recommended text books**

**19. Useful websites**

MSc Neuroscience website: <http://neuroscience.iop.kcl.ac.uk/msc>

MSc e-learning site: <http://moodle2.iop.kcl.ac.uk> (login required)

Department of Addictions:

<http://www.kcl.ac.uk/iop/depts/addictions/index.aspx>

MRC Centre for Social, Genetic and Developmental Psychiatry website:

<http://www.kcl.ac.uk/iop/depts/mrc/index.aspx>

MRC Centre for Developmental Neurobiology website:

<http://www.kcl.ac.uk/depsta/biomedical/mrc/index.php>

Centre for Neuroimaging Sciences: <http://www.neuroimagingciences.com/>

**MODULE APPROVAL FORM  
SECTION 2 – SUPPLEMENTARY INFORMATION**

This section will not be relevant for all modules

**1. Module name**

A2 Fundamental Neuroscience

**2. In cases where parts of all of the module are delivered either away from one of the College campuses and/or by a body or bodies external to the College please provide the following details**

Name and address of the off-campus location and/or external body    N/A

Percentage of the module delivered off-campus or by external body    N/A

Nature of the involvement of external body    N/A

Description of the learning resources available at the off-campus location    N/A

What mechanisms will be put in place to ensure the ongoing monitoring of the delivery of the module?    N/A

***Where students are undertaking placements/year abroad/year in employment please provide the guidance information presented to students undertaking this method of study***

**MODULE APPROVAL FORM  
SECTION 3 – ADMINISTRATIVE INFORMATION**

<b>1. Module name</b> A2 Fundamental Neuroscience
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<b>2. Start date</b>		<b>3. Numbers</b> (if applicable)	
<b>Year</b> Continuing	<b>Month</b>	Maximum	
		Minimum	10

**4. Availability** (please indicate when the module is available and when the examination will take place – indicate if this is different for Study Abroad students)

**Period of study (dd/mm/yy – dd/mm/yy)**

	<b>From (dd/mm/yy)</b>	<b>To (dd/mm/yy)</b>
Sem 1		
Sem 2		
Term 1		
Term 2		
Term 3		
Standard year		
Other	From mid October to mid November each year	January the following year

*NB: If module is being delivered more than once during the academic year, note the **full set** of dates that the module is available*

**Examination period (Period 1 (January)/Period 2 (May)/Period 3 (Other))**

<i>Period 1 (January)</i>	<i>December-January</i>
<i>Period 2 (May)</i>	
<i>Period 3 (Other – please note the month)</i>	

*NB: if module is being delivered more than once during the academic year, note which examination period relates to relevant period of study.*

**5. Superseded modules** (please list any modules that the proposed module supersedes and indicate whether such modules have ever been taught or examined)

Module title and code	Taught	Examined
Module is already running	√	√

**6. Contributing departments/divisions/Schools** (please give details if the module will not be taught exclusively within the proposing department) Please note that % of contribution must be a fixed percentage not in a range (e.g. cannot be 0 – 20%)

Contributing Department/ Division/School	Nature of involvement	% contribution to teaching



Module approval 2012/13

<ol style="list-style-type: none"> <li>1. Dept of Neuroscience, IoP (host)</li> <li>2. Department of Clinical Neuroscience, IoP</li> <li>3. MRC Centre for Developmental Neurobiology, Guy's Campus</li> <li>4. Department of Biological Sciences, Open University</li> <li>5. Department of Human Communication Science, UCL</li> </ol>	<p>Each department will contribute to the student learning contacts (lectures, seminars. tutorials)</p>	<p>25%</p> <p>10%</p> <p>30%</p> <p>30%</p> <p>5%</p>
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**MODULE APPROVAL FORM  
SECTION 4 – THE APPROVAL PROCESS**

**1. Module name**

A2 Fundamental Neuroscience

**2. Initial approval/consultation at the planning stage**

(a) Will the new module require new ISS stock or facilities/systems?

Yes

No

(b) Will the new module require any new resources (e.g. teaching space, staff, offices, additional support from central services?)

Yes

No

(c) If the new module contains student activities that involve human subjects, has the appropriate ethical approval been sought and granted

Yes

No

If Yes to (a) and/or (b) above, please attach details and signed approval from the relevant College officer

If Yes to (c) please attach confirmation of ethical approval, including the ethics approval number

**3. Approval by the School Education Committee**

Date module approved: .....

Signature of the Chair of the School Education Committee:..... Date: .....

(Electronic signatures are acceptable)

**4. Approval for modules jointly taught by more than one School**

Date module approved by the second School(s): .....

Signature of the Chair of the second School Education Committee(s):..... Date:.....

(Electronic signatures are acceptable)

**MODULE APPROVAL FORM  
SECTION 5 – MODULE SET UP ON SI (IN SCHOOL)**

**1. Module name**

A2 Fundamental Neuroscience

**2. School approved to set Module up on SI**

Yes

No

*For Quality and Academic Support Section (QAS) purposes only:*

**3. Information recorded on form approved by QAS?**

Yes

No, sent back to School

**If no, why was the form sent back to the School?**

**4. If the module was picked as part of a sample and checked by Information Development and Analysis, was the information recorded on SI correct?**

Yes

No

**If no, what information had been incorrectly inputted**