***NEUROSCIENCE AND NEUROTECHNOLOGY (NSNT)***

***ADDITIONAL QUESTIONS\****

***I. PLEASE CONTACT WITH AN NSNT FACULTY MEMBER[[1]](#footnote-1) AS A POSSIBLE Ph.D. THESIS ADVISOR BEFORE THE APPLICATION TO THE PROGRAM. (It is strongly advised to concact, but If no connection has been made with NSNT academicians, specify your reasons below)***

WRITE DOWN THE NAME(S) OF NSNT FACULTY MEMBER(S) CONTACTED.

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Note that contacting with a NSNT Faculty Member for a possible PhD. Thesis study before the application and giving information about it in your intention letter may be beneficial for your application consideration.

***II. DO YOU HAVE A MATHEMATICAL BACKGROUND? (If no, leave the question blank)***

***(Courses taken in BS, M.Sc or online courses may be counted)***

WRITE DOWN CODES & NAMES OF COURSES TAKEN BEFORE [AS REGISTERED OR ONLINE COURSES], COVERING TOPICS SIMILAR TO CONTENT OF *METU MATH 117, MATH118, MATH260, STAT153*

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**Please refer the contents given below:**

***MATH 117, Calculus I***

***METU Credit & ECTS Credit: (4-2)5 & 7.5***

Functions, Limits, continuity and derivatives.

Applications. Extreme values, the Mean Value Theorem and its applications.

Graphing. The definite integral. Area and volume as integrals. The

indefinite integral. Transcendental functions and their derivatives.

L'Hospital's Rule. Techniques of integration. Applications.

***MATH 118, Calculus II***

***METU Credit & ECTS Credit: (4-2)5 & 7.5***

Techniques of Integration. Arc Length. Volumes and

Surface Areas of Solids of Revolutions. Improper Integrals. Sequences and

infinite series. Power series. Taylor series. Vectors and analytic geometry in 3-

space. Functions of several variables: limits, continuity, partial derivatives.

Chain rule. Directional derivatives. Tangent planes and linear approximations.

Extreme values. Lagrange multipliers. Double integrals

***MATH 260, Basic Linear Algebra***

***Credit: (3-0)3***

Matrices, operations on matrices, special types of matrices . Elementary row operations, row equivalence . Invertibility, inverse of a matrix , Systems of linear equations . Gaussian Elimination, Homogeneous equations, invertibility and systems . Determinants: definition, properties. Cofactor expansion, Cramer’s rule, Trace. Vector Spaces, subspaces, linear span, linear independence. Basis and dimension, coordinates, row space, column space, solution space of a matrix. Inner product spaces, norm and orthogonality. Orthogonal and orthonormal bases, the Gram-Schmidt orthogonalization process, orthogonal projections. Eigenvalues, eigenvectors and diagonalization. Matrix exponentials, diagonalization of real symmetric matrices. Linear transformations, Kernel and image. Matrix representation of linear transformations.

***STAT 153, Probability I***

***Credit: (3-2) 4***

Sample space, events. Basic combinatorial probability, conditional probability. Bayes’ theorem, independence, random variables, distributions, expectation.

***III. DO YOU HAVE A NEUROSCIENCE BACKGROUND? (If no, leave the question blank)***

***(courses taken in BS, M.Sc or online courses)***

WRITE DOWN CODES & NAMES OF COURSES TAKEN BEFORE [AS REGISTERED OR ONLINE COURSES], COVERING TOPICS SIMILAR TO CONTENT OF *HACETTEPE UNIVERSITY, MEDICAL FACULTY NSC789: BASIC CONCEPTS OF NEUROSCIENCE*

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**Please refer the contents given below:**

***NSC789, Basic Concepts of Neuroscience***

CNS afferent and efferent pathways, spinal cord, brain stem, cerebellum, cranial nerves.

Autonomic nervous system, thalamus, hypothalamus, hypophysis, subthalamus, epithalamus, basal ganglia.

Morphology of the brain hemispheres, limbic system.

Brain membranes and sinuses, CSF, CNS vessels.

Motor functions, sensory functions.

Functions of multimodal association areas.

Limbic system physiology.

Physiology of BG, thalamus, hypothalamus and hypophysis.

mRNA&protein synthesis, transport and regulation.

Cell biology (membrane, organells, receptors).

Cellular elements of CNS.

Signal transmission in nervous system.

***You can search METU Neuroscience and Neurotechnology, Academic Staff and Keywords here:***

*https://nsnt.metu.edu.tr/en/personel*

*https://nsnt.metu.edu.tr/en/system/files/metu-hu\_nsnt\_phd\_program\_keywords.pdf*

1. https://nsnt.metu.edu.tr/personel [↑](#footnote-ref-1)