I- Master's Degree with Thesis - Written Exam Topics

➢ Python Programming

Topics: Introduction to programming & Python basics. Data types and string processing. Functions and procedures. Conditional statements. Loops and iteration. Lists and their operations. Dictionaries and hash tables. Object-oriented programming basics.

Reference Books:

- Downey, A. Think python. O'Reilly Media, Inc., 2012.
- Matthes, E. Python crash course: A hands-on, project-based introduction to programming. no starch press, 2023.
- Zelle, J. M. Python programming: an introduction to computer science. Franklin, Beedle & Associates, Inc., 2004.
- David Evans, CS101: Intro to Computer Science, http://creativecommons.org/licenses/by-nc-nd/4.0

➢ Python for Data Science and Artificial Intelligence

Topics: Advanced data types. Iterators and generators. Arrays with Numpy. Data frame structures, input-output, and data analysis with Pandas. Data visualization with Matplotlib. Scientific computing, optimization, and machine learning with SciPy and TensorFlow.

Reference Books:

- Udacity. (n.d.). CS212: Design of Computer Programs. https://www.udacity.com/enrollment/cs212
- Massachusetts Institute of Technology. 6.0001 Introduction to Computer Science and Programming in Python. MIT OpenCourseWare, 2016.
- Guttag, J. V. Introduction to computation and programming using Python: with application to computational modeling and understanding data. MIT Press, 2021.

➢ Probability and Statistics for Data Science and Artificial Intelligence

Topics: Basic Probability. Random variables. Expectations. Probability distributions. Sampling distributions. Hypothesis testing. Linear regression

Reference Book: Walpole, R. E. et al. Probability and Statistics for Engineers and Scientists, Prentice Hall, 9th Edition, 2009.

➢ Mathematics for Data Science and Artificial Intelligence

Topics: Functions of multi-variables and gradient. Fundamentals of linear algebra relevant for data science and artificial intelligence. Basics of differential equations. Basic optimization for data science and artificial intelligence. Essential information theory concepts and results relevant for data science and artificial intelligence.

Reference Book: Deisenroth, M. P., Faisal, A. A., and Ong, C. S. Mathematics for Machine Learning, Cambridge University Press, 1st edition, 2020.
https://mml-book.github.io/

II- Master's Degree with Thesis - Oral Exam

Considering the courses you have completed in programming, computer science, mathematics, statistics, and probability, you will be asked questions that assess your understanding of the fundamental concepts related to these fields.