NordSecMob – Master's programme in Security and Mobile Computing

Required document n:o 7 – University course descriptions

Name of the applicant: Application number:
Samy Saad Samy Shehata 98587

The applicants should have solid knowledge of mathematics (discrete mathematics), programming skills, data structures and algorithms, computer architecture and basics of computer networks. In addition, basic knowledge of the following subject areas will be an advantage: databases and database management, principles of theoretical computer science, logic in computer science, software engineering, operating systems and concurrent programming. Please use this form to provide the course descriptions.

Please list the most relevant/advanced course(s) and the course contents you have taken in the following categories. You can either copy the course contents from your study guide (please mention the source) or write the description yourself (Required). Please list the topics taught on the course into the course description. Note, that it is not necessary to have two courses in each category!

WWW address of the university (if available) in English for verifying the course descriptions:
www.met.guc.edu.eg

1) Math courses, especially computing related like discrete mathematics and mathematical logics, 2 most relevant/advanced courses methodology and languages

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Mathematics V (Discrete Math)
Course content:
Motivation for discrete mathematics, propositional logic, formal proof methods, predicate logic, sets and set operations, graphs and graph algorithms such as Dijkstra's and Prim's

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Mathematics III
Course content:
Differentiation of functions in more than one variable, gradients, divergents, curls, extrema and differential equations.

2) Programming courses, 2 most relevant/advanced courses on software

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Concepts of Programming Languages
Course content:

Logic programming: Prolog, functional programming: Haskell, procedural programming: C, opject oriented programming: Java. ADT and data structures, typing, polymorphism and genericity, memory management and exception handling techniques.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Computer Programming Lab
Course content:

Opject oriented programming, GUI applications, Exception Handling

3) Data structures and algorithms (leave out basic programming), 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Analysis and Design of Algorithms
Course content:

Mathematical preliminaries, divide and conquer, master theorm, dynamic programming, greedy algorithms, graph algorithms and string matching algorithms.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Data Structures and Algorithms
Course content:

Complexity analysis, sorting algorithms, searching, linked lists, stacks, queues, trees, hash tables and hash functions, graph and graph algorithms.

4) Computer architecture, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Microprocessors
Course content:

Basics and evaluation metrices, design of instruction sets, programs and processors: multimedia, networking and security, memories and queueing models and concurrent processes and input and output.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Computer System Architecture
Course content:

Performance measurement, instruciton set basics, pipelines, instruction level parallelism, memory hierarchy and multithread/multiprocessors systems.

5) Computer networks and data communications, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Introduction To Communication Networks
Course content:

Protocol layering, application layering: HTTP, SMTP, FTP, DNS. Transport layer: UDP, TCP. Network layer: routing, internet protocol, mutlicast routing. Mobile IP, Data link layer and mutlimedia and quality serivce.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Network & Media Lab
Course content:

Ip network configuration, network analysis, transmission parameters, low level protocols, high level protocols, video conference systems, video streaming, QoS and traffic engineering, mobile IP and network simulator NS-2

6) Databases and database management, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Databases II
Course content:

Indexing: single, multilevel, balanced trees and cost based. Query optimisation: heuristic and cost based. Transactions and concurrency control, recovery techniques, XML and webservices.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Databases I
Course content:

Concepts of a database and database management, Entity-Relationship model, database design, relational model, normalisation, physical design, file organisation and accessing, indexing, SQL and practical examples using ASP.

7) Theoretical computer science and formal methods, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Theory of Computation
Course content:

Formal languages: regular and context free languages, context sensitive language, type-0 languages, turing machines and the chomsky hierarchy. Computability theory: recursive and recursively enumerable language, turing comutable functions, decidable and undecidable problems and church's thesis. Complexity theory: time and space complexity, P and NP classes and reducibiltiy, NP hardness.

Level of the course: ☐ Bachelor ☐ Master
Name of the course in your transcript:
Course content:

8) Logic in computer science, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Mathematics V (Discrete Math)
Course content:
First order logic, predicate logic, propositional logic and resolution.

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Introduction to Artificial Intelligence
Course content:
(Not yet included in transcript, part of senior year). Propositional logic, predicate logic, resolution, logical reasoning systems, planning and acting.

9) Software engineering, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Software Engineering
Course content:
The software system lifecycle, ethical and social issues, computer based system engineering, software processes, project management, software requirements, requiremenets engineering, CASE technology, specification, architecural design, system models, verificaiton and validation and software testing.

Level of the course: ☐ Bachelor ☐ Master
Name of the course in your transcript:
Course content:

10) Operating systems, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Operating Systems
Course content:

Computers and operating systems structures, processes and thread management, scheduling policies, concurrent processes and synchronization, deadlocks, memory management and virtual memory, file systems and I/O management.

Level of the course: ☐ Bachelor ☐ Master
Name of the course in your transcript:
Course content:

11) Concurrent programming, 2 most relevant/advanced courses

Level of the course: ☑ Bachelor ☐ Master
Name of the course in your transcript: Operating Systems
Course content:

Computers and operating systems structures, processes and thread management, scheduling policies, concurrent processes and synchronization, deadlocks, memory management and virtual memory, file systems and I/O management.

Level of the course: ☐ Bachelor ☐ Master
Name of the course in your transcript:
Course content:

12) Other remarks concerning the course descriptions:

There are courses that cover some of the above subjects, but are not yet included in the official transcript (part of senior year). A list of these courses is submitted with the application. Some of theses courses include:

Introduction to Artificial Intelligence
Knowledge Representation and Reasoning