Study plan proposition

Student name	***Scheffmacher, Zepeda***
Home institution	Florida Institute of Technology
Degree program at the home institution	Computer Science
Total US credit hours required for graduation	129
Total US credit hours completed by the end of the fall semester of the academic year 2010/2011[1]	89 (including 4 transfer credits)
EU degree sought	BME[2] Software Engineering
Total ECTS credits required for the EU degree	210
Amount of ECTS credits recognized based on studies in the US	141
Amount of ECTS credits to obtain during studies in Europe	69

List of courses to complete in Europe during the academic years 2010/2011 (Spring) and 2011/2012 (Fall)

Course code and name (BME/RMA[3])	**ECTS**	**Course code and name FIT**	**US credit hours**	**Semester in Europe**
BMEVISZA213 - Theory of algorithms	*5*	CSE4081 – Intr. to analysis of algo.	*3*	Spring
BMEVISZA110 – Intro. to the Th. of Comp. 2	*4*	Restricted elective (Mathematics)	*3*	Spring
BMEVIMIA219 - Operating Systems	*4*	CSE4001 – Operating Sys. Concepts	*3*	Spring
BMEVIHIA215 – Computer Networks	*4*	Computer Architecture	*3*	Spring
BMEVIAUA218 – Software Techniques	*4*	Restricted elective (Comp. Sci.)	*3*	Spring
BMEVITMA314 - Management of Inf. Sys.	*4*	Technical elective	3	Spring
BMEVITM347 – Optical Networks	*4*	Restricted elective (Comp. Sci.)	*3*	Spring
BMEVIIIA363 – Project Laboratory	*6*	CSE 4101 – Comp. Sci. Projects 1	*3*	Spring
BMEGT62AF51 – French for Engineers	*2*	-	-	Spring
IN010 – Technologie des bases de données (Database technologies)	3	CSE 3101 – Machine and Assembly Language	3	Fall
MS002 Dynamics of Vehicles	3	OCE4593 Special Topics	2	Fall
PS0003 – Communication Psychology	2	-	-	Fall
PS001 – Introduction to Psychology	2	-	-	Fall
EL007A – Design of remote sensing systems	4	ENS 4009- Science Elective	3	Fall
BMEVIIIAxxx -Thesis (at the RMA)	15	CSE 4102 – Comp. Sci. Projects 2	3	Fall
HI004 History of War	3	-	-	Fall

Important remarks and conditions

1. The amount of ECTS credits obtained under BME course code must be at least 52 in order to obtain any BME degree. The above list satisfies this condition.
2. The BME degree in addition to the 210 ECTS credits obtained requires a thesis defense and final examination in two subjects with BME code.
3. The list of courses may slightly change due to course scheduling conflicts since some of the courses are offered to 3rd or 2nd year students at the BME.
4. Official English language transcripts will be provided to the student by the BME and by the RMA.

Budapest, 7 September, 2010

[1] Assuming that the student will obtain all credits of the courses selected for the current (2010 fall) semester
[2] Budapest University of Technology and Economics
[3] Royal Military Academy

Descriptions of BME courses:

Theory of algorithms (BMEVISZA213, 2/2/0/exam/5 credits). Algorithms. Sequential and binary search. Search with some basic data structures, like search tree, AVL tree, B-tree, hash table. Sorting by insertion, merge sort, heap sort, quicksort, bin sort, radix sort and the analysis of these methods. The complexity of sorting. Basic graph theoretical algorithms: BFS, DFS and their applications to determine (strongly) connected components. Algorithms for acyclic graphs. Finding maximal matching in bipartite graphs. Determining shortest paths by methods of Bellman-Ford, Dijkstra, and Ford. Minimal spanning tree algorithms and the union-find data structure. General algorithmic methods: branch and bound, divide and conquer, dynamic programming. Efficient approximation algorithms. Algorithmically hard problems, the notion of NP and NP-completeness.

Management of information systems (BMEVITMA314, 3/1/0/exam/4 credits). System-level overview and architectures. Strategic level design, implementation and operation tasks. Life cycle of information systems. Total Cost of Ownership, TCO management. Typical architectures, central, client-server, 3-layer schemas. Quality of Services. Reliability, Availability, Serviceability (RAS). Manageability. Asset management, system management, server management, network management,. inventory management, configuration management, power management, Structure of Management Information (SMI). Management Information Base (MIB). Internet Standard MIB, Private MIB. Common Information Model (CIM). Management Object Format (MOF). Simple Network Management Protocol (SNMP). Windows Management Interface (WMI), Web-Based Enterprise Management (WBEM). Standards. Integrated Network and System Management (INSM). Management Information Format (MIF). Desktop Management Task Force (DMTF). Desktop Management Interface (DMI)., Management Interface (MI), Advanced Configuration and Power Interface (ACPI), Boot Integrity Service (BIS). Interoperability issues. Operating tasks. System log, event management, fault management. Data storage management. Scalability basics. Maintenance, maintenance strategies. Documentation standards. Software upgrade.

Computer Networks (BMEVIHIA215, 3/1/0/exam/4 credits). Fundamentals in Computer Networks. Classification. History. Standardization. Convergence. Communication of Remote Processes. Modeling and reference Models: ISO-OSI and TCP/IP. Physical Level Data Transmission. Problems of signal generation, signal transmission and data recovery. Analog transmission: modems, standard serial interfaces. Digital transmission: line encoding, codec. Multiplexing techniques: FDM and TDM. Asynchronous and synchronous transmission. Private and public data networks. ISDN, ADSL, cable TV. Data Link Level Data Transmission. Type of services. Tasks to be solved: framing, error control, flow control, link management. Data link protocols. Data Link Level Data Transmission in LANs. Features of LANs. Special characteristics of the LAN Reference Model. MAC protocols. LLC protocols. Wireless LAN protocols. Network Level Data Transmission. Type of services in packet swithed networks: datagram and virtual circuit. Routing. Congestion control. Interconnection of networks. Gateway, router, bridge, switch, repeater. Internet protocols. Transport Level Data Transmission. Type of services. Elements of protocols. Addressing. Transport connection management. Flow control. Multiplexing. TCP and UDP. Higher Level Services. Session and presentation level services. Application Level Services and Protocols. Application level of TCP/IP Reference Model. DNS. E-mail. Web. Network Management. Reasons of network management. Tasks to be solved. Hardware and software elements. SNMP.

Operating Systems (BMEVIMIA219, 3/1/0/exam/4 credits). Lecture: Introduction. History of the operating systems. Today's operating systems. General description: Tasks, interfaces, functions, structures, operation. Processes and threads. Process co-operation, synchronization, and communication. Deadlock. Multiprogramming and multiprocessing systems. Queuing and state transition models. CPU scheduling. Memory management. Virtual memory management. Secondary storage management. File management.

Periphery handling. Programming interfaces. Protection and security. User level knowledge. Selection criteria and system design. The UNIX operating systems. Internal structure. Scheduling. Signal handling. Process communication. File management. Distributed systems. Basics. Network communication. Distributed file systems. Distributed operating systems. Distributed coordination. Security and protection. Labs: Illustrative examples, case studies, user level knowledge.

Introduction to the theory of computing 2 (BMEVISZA110, 2/2/0/exam/5 credits). Lecture: Introduction. History of the operating systems. Today's operating systems. General description: Tasks, interfaces, functions, structures, operation. Processes and threads. Process co-operation, synchronization, and communication. Deadlock. Multiprogramming and multiprocessing systems. Queuing and state transition models. CPU scheduling. Memory management. Virtual memory management. Secondary storage management. File management. Periphery handling. Programming interfaces. Protection and security. User level knowledge. Selection criteria and system design. The UNIX operating systems. Internal structure. Scheduling. Signal handling. Process communication. File management. Distributed systems. Basics. Network communication. Distributed file systems. Distributed operating systems. Distributed coordination. Security and protection. Labs: Illustrative examples, case studies, user level knowledge.

Software techniques (BMEVIAUA218, semester 4, 3/1/0/exam/4 credits). The class members will be exposed to the techniques of manufacturing object oriented software systems, as well as the most important methods of event-driven programming. Moreover, the students acquire familiarity with the structures and fundamental implementation techniques of graphical user interface and the rapid application development approaches. Presenting the Windows/Linux programming facilities along with the analysis of the roles and the significance of class libraries and their comparison are also among the focused topics. Besides the development-oriented methods, the most important principles of the source code management systems (SourceSafe, ClearCase, CVS, etc.) are also focused because of the important role they play in software life cycles. We also stress the client side development, including but not limited to thick and web-based clients. The conveyed knowledge is illustrated by case studies. In summary, 'Software Techniques' provides the fundamental knowledge to develop software for the most current and popular platforms (e.g. Windows, Linux) with up-to-date tools and technologies.

Information and Network Security (BMEVITMM280, 3/1/0/exam/4 credits). The goal of the lecture is to give theoretical and practical knowledge on recent information and network security. Attacks and threats. Introduction to cryptography. Ciphering, block ciphers and stream ciphers (DES, 3DES, AES, RC4). Asymmetric key encryption (RSA). Cryptographic hash functions. Keyed hash functions. Key management protocols. Digital signature. Protection of the networked communication. Attacks to the communication. Encryption protocols (IPSec, TLS/SSL). Virtual private networks. Firewalls, Network Address Translation, Intrusion Detection Systems, Honeypots. Vulnerability assessment. Protection of WiFi wireless networks. WEP, WPA, 802.11i protocols.