Hochschule München University of Applied Sciences

Courses in English
Course Description

Department	07 Computer Science and Mathematics
Course title	**Secure Network Management**
Hours per week (SWS)	4
Number of ECTS credits	5
Course objective	Learn the principles of computer network management techniques such as: Management Information Bases (MIB II, RMON1, RMON2, Private MIB), Network Management Protocols (SNMP1, SNMP2, SNMP3), Abstract Syntax Notation.One (ASN.1), Network Security Management (Analysis of network attacks, Firewall, Intrusion Prevention) Apply management techniques on various network configurations and network components based on exercises in the network management virtual laboratory.
Prerequisites	Basic knowledge in computer networks or data communications.
Recommended reading	1. J. Richard Burke, "Network Management, Concepts and Practice: A Hands-on Approach" Prentice Hall, Upper Saddle River, NJ, 2004. 2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2" 3rd Ed. Addision Wesley Inc., Reading. MA, 2006. 3. Peter Mellquist, "SNMP++: An Object-oriented Approach to Developing Network management Applications", Prentice Hall, London 1998. 4. Online tutorials, online exercises, and over 100 questionnaires with explained answers within the virtual laboratory on: TCP/IP Troubleshooting, Network Management, Routing Protocols, Router Configuration, Switching, Network Security Management (Firewall, VPN, Attacks) Developing Network Mgm. Appl. based on SNMP++ Library, SNMP-Java Library and MIB II
Teaching methods	Electronic media presentations, demos, case studies
Assessment methods	40% of the grade will be based on reports/questions on the results of exercises, project, 60% of the grade will be based on final exam questions.
Language of instruction	English
Name of lecturer	Prof. Dr. Alexandru Soceanu
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Course content

Surveys of Basics on Computer Networks: Medium Access Control for Ethernet and WiFi 802.11 networks, TCP/IP Protocol Stack, Spanning Tree Protocol, Virtual LAN, Routing-Algorithms, Routing-Protocols, Routing-Tables.
Network Management Architecture and Functionality: ISO Reference Model, Software Architecture, Distributed Network Management, Proxy Architecture, Network and Performance Monitoring, Fault Management, Network Configuration, Quality of Service (QoS).
Management Information Bases: SMI-Data Structure, MIB Structures: Objects, Tables, Standard-MIBs: MIB I, MIB II, Ethernet-MIB, ASN.1 Formal Language, Remote Monitoring MIBs: RMON1 and RMON2, Private MIBs, RMON-Probes.
SNMP-Protocol: Operation and Access Methods, Message Format, Polling-Intervals, Security, SNMP1&2&3.
Network Security: Firewalls: Role, Architecture, Planning and Configuration, Case Study, VLANs, IP v6, Intrusion Detection/Prevention.
Management of the Network Security: Firewall Operation, Create Fw-Rules, Network Address Translation, Port Address Translation, Intrusion Detection System, Intrusion Prevention System, Wireless Network Security Techniques.
Network Management Tools: Network General Sniffer, Wireshark, HP-Open View, 3COM-Transcend, VLAN Manager, RMON-Tool Hifn, Firewall Checkpoint One, Intrusion Prevention System (McAfee)
Online exercises within the virtual laboratory of vhb:
1) Frame analyses based on Wireshark-Analyser, 2) Using a RMON-Tool based on Hifn Tool, 3) Using a Network Management Tool based on HP-Open View, 4) Configuration and setup Spanning Tree for Bridges, 5) Setup 3Com/Sonix ISDN Router, 6) Setup CISCO ISDN Router, 7) Setup CISCO Ethernet Router, 8) Setup a VLAN-Manager for a switch 3COM-CB 5000, 9) Setup Quality-of-Service (QoS) for CISCO-Routers, 10) Setup a Firewall System from Check Point One, 11) Setup an Intrusion Prevention System: IPS McAfee

Remarks