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THE CONCEPT OF IT EDUCATION IN UKRAINE

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Large corporations and IT-companies are considered as the pioneers of conception of «double education»: obligatory base preparation and additional certificated education at the applied courses. This ideology allows students to gain an university diploma within the special educational IT-courses. Co-operation between an university and IT-companies directed on advancement of practical disciplines and specialized courses for the complete higher education getting is a necessary requirement for development of information security (IS).

Keywords: higher education, educational programs, specialist preparation, information security, information technologies security.

Великі корпорації та ІТ-компанії по праву вважаються піонерами концепції «подвійної освіти»: обов'язкова базова підготовка і додаткове сертифікаційна освіта на прикладних курсах. Дана ідеологія дозволяє студентам отримати університетський диплом у рамках спеціальних освітніх ІТ-курсів. Взаємодія між університетом та ІТ-компаніями, спрямована на просування практичних дисциплін та спеціалізованих курсів для отримання повної вищої освіти є необхідною умовою, для розвитку інформаційної безпеки.

Ключові слова: вища освіта, навчальні програми, підготовка спеціалістів, інформаційна безпека, безпека інформаційних технологій.

Task definition

Forming of information security field is based on the solution of complex of related problems which can be conditionally united in the followings groups: conceptual, standard and organizational. In order to expose the offered complex of questions in details, it is necessary to realize the purposeful cycle of articles. In this article the conceptual solutions of questions of preparation, retraining and in-plant training of shots are examined in area of informative safety in the conditions of their accordance international standards.

In this article the conceptual solutions of questions of preparation, retraining and in-plant training of staff in information security field are discussed in the conditions of their accordance to international standards.

Questions that must be defined by this conception: circle of problems and proper purpose of educational field «Information security» introduction, and also comparative analysis and ways of solution of this problem in obedience to international standards and requirements. Derivatives from the adopted conception are a level, functions and maintenance of teaching of specialist in information security field.

Analysis of the educational programs and strategies

Information technologies security (ITS) — is the most progressive and quickly developing field, and the supervisory branch of world services sector in the long term. Possibility to occupy serious leading positions with low initial capital investments on the base of ITS-technologies appeared to become a principal reason of development of this direction in many countries of the world. One of necessary conditions and key factors which determine success of the state or companies at IT-services market is a presence of highly skilled staff.

On the current stage of society development and information space integration a lot of international universities (together with IT-companies) attained considerable successes in the sector of higher education in the information security field. This teaching system combines effectively the structure of higher academic establishments and conforming to the requirements of modern standards and labor market which guarantee the obtaining of high-quality higher education in ITS-technology field.

The considerable increase of number of universities that provide the preparation in IS is observed in the Far-Eastern regions, especially in China and India, that testifies to sharp development of information technologies in these countries.

High-professional staff and proper system of specialists preparation will allow any country to occupy strong positions at the of IT-service market.

Passing to consideration of educational programs of universities and partner companies first of all it should be noted that strictly practical orientation on the decision of professional tasks is their main distinguishing feature. Orientation on work with modern and wide-spread applications in conditions that are maximally close to reality, guarantees that knowledges and abilities which are really demanded by a labor market will be got, and let a graduating student to begin productive work immediately after employment.

In addition, additional advanced training courses in IT- and ITS-technologies field, can and must become a base for the association of existent elements of current tutorials of university and applied tasks of practical work. Large corporations and IT-companies are considered as the pioneers of conception of «double education»: obligatory base preparation and additional certificated education at the applied courses. This ideology allows students to gain an university diploma within the the special educational IT-courses.

It is necessary to emphasize once more that preparation program of specialists in IT and ITS field — especially engineer-practical. In the program of specialists preparation, so-called «Humanitarian block of disciplines»: political science, sociology, cultural science, psychology and other obligatory disciplines that accompany domestic plans, — absents.

Organizational aspects of educational process

Duration of educational semester in University makes 18 (16 weeks of classes + 2 week on preparation to testing = 18 weeks per semester) weeks. On this basis University divides a semester on two fourth, which carry out 24 educational cycles for 18 weeks. Thus University admit possibility, to carry out 1,5 educational cycle in the week of stationary work during 16 weeks. Thus the last 2 weeks are reserved for preparation to the control testing: work on an academic year project, control, technical tasks, and also this period includes presentation and consideration of works to teachers.

For realization of 1,5 educational cycle it is necessary to realize stationary 12 university hours (8+4) every week. Classes are given during 6 days in a week (from Monday to Saturday).

The academic hour of "clean" teaching time makes 120 minutes (complete — 140 minutes). The general time, expended on preparation of specialist in a week, makes: 28–30 h (1 h/60min) or approximately 37–39 h, (1 h/45min — classic academic hour for our universities). However, it is time of only base education for one week.

Quaternary/certificated courses pass parallelly to the educational process in order to get a base education, but courses for certificate last only 9 weeks (8 weeks of classes + 1 week on preparation = 9 weeks per one certification course). Thus general time of preparation of IS-specialist, makes approximately: 52–58 hours in a week. It is necessary to say for comparison that in obedience to the requirements of Ministry of Education and Science of Ukraine, total time of stationary form of bachelor preparation must not exceed 26 h (1 h/45 min) in a week.

For preparation of master's degree in obedience to domestic standards even less time is necessary: 18–22 h (h/45 min). Lets mark once more that considerable part of time in domestic curricula is devoted to humanitarian and general disciplines, this at the same time decrease the time of blocks of professional direction disciplines.

Educational programs and technical base requirements

In this section the examples of basic themes, which are studied within the separate modules in the system of higher education of foreign universities at preparation of IS-specialists, are presented. The methods of material presentation, amount of hours will be discussed in details in subsequent materials if necessary. Some names of base tracks and their structure:

• SET — Software Engineering Track — Java-technologies, Microsoft, NET-technologies;

• NET — Network Engineering Track) — Unix та Linux platform, Microsoft Windows platform;

• ANISET — Advanced Network & Information Security Engineering Track;

• ISST — Information Security Systems Track.

Each of the tracks described higher lasts 2 semesters in a year which makes 4 quarters totally. At the inconsistent passing of quarters, every fourth is examined as a certification course within of which a student gets all necessary knowledges in the proper areas.

For exposition of necessary material and organization of educational process general requirements to software and hardware equipment of universities that provide the preparation in IS field are reflected and fixed in educational programs:

1. Software development track:

• setup disks Windows Server/Windows. Net-Server with Client Access Licenses (CAL) for every unit; setup disks Windows Professional/WindowsXP Professional with a license for every machine;

• OS Unix, Linux and Linux Advanced Server (Red Hat);

• SQL Enterprise Server with a license for one machine and CAL for every unit;

• Java Enterprise Edition (JEE);

• Visual Studio.Net (Enterprise Edition);

• JMEJava Micro Edition (JME);

• programs of projection equipment control for computer classes.

2. Advanced Network & Information Security Engineering Track:

• loadings disks DOS;

• OS Windows and Windows Server, Unix;

• WindowsNT Server;

• RedHatLinux ;

• drivers for all above-stated systems;

• packages of renewals and corrections (SP, IE);

• ISAServer(for the domen controller NDC);

• instruments of disks cloning and utilities for the change of unique safety identifier (SI);

• traffic control systems;

• instruments of the vehicle keys collection of (equipment identifiers);

• setup disks with the software for brand-mauering — Checkpoint Firewall, etc.
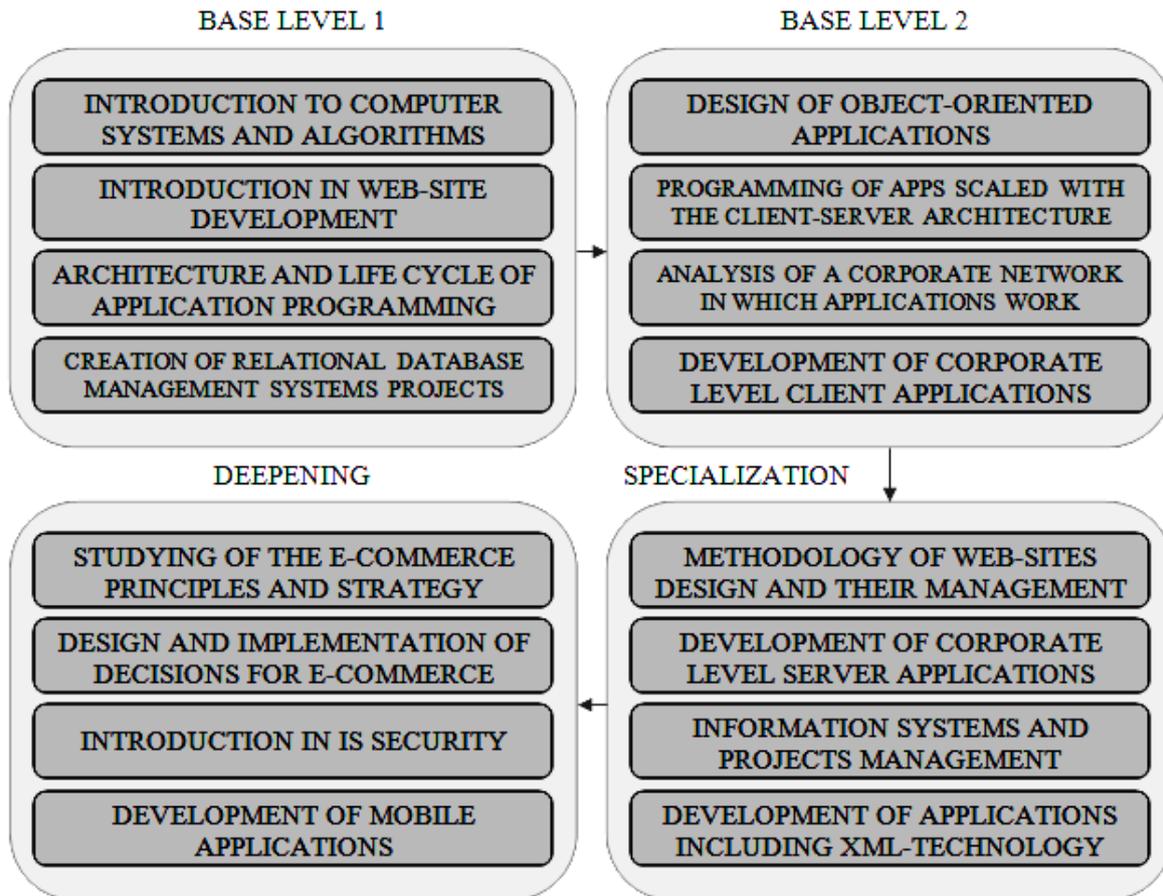
BASE LEVEL 1

- INTRODUCTION TO COMPUTER SYSTEMS AND ALGORITHMS
- INTRODUCTION IN WEB-SITE DEVELOPMENT
- ARCHITECTURE AND LIFE CYCLE OF APPLICATION PROGRAMMING
- CREATION OF RELATIONAL DATABASE MANAGEMENT SYSTEMS PROJECTS

BASE LEVEL 2

- DESIGN OF OBJECT-ORIENTED APPLICATIONS
- PROGRAMMING OF APPS SCALED WITH THE CLIENT-SERVER ARCHITECTURE
- ANALYSIS OF A CORPORATE NETWORK IN WHICH APPLICATIONS WORK
- DEVELOPMENT OF CORPORATE LEVEL CLIENT APPLICATIONS

DEEPENING

- STUDYING OF THE E-COMMERCE PRINCIPLES AND STRATEGY
- DESIGN AND IMPLEMENTATION OF DECISIONS FOR E-COMMERCE
- INTRODUCTION IN IS SECURITY
- DEVELOPMENT OF MOBILE APPLICATIONS

SPECIALIZATION

- METHODOLOGY OF WEB-SITES DESIGN AND THEIR MANAGEMENT
- DEVELOPMENT OF CORPORATE LEVEL SERVER APPLICATIONS
- INFORMATION SYSTEMS AND PROJECTS MANAGEMENT
- DEVELOPMENT OF APPLICATIONS INCLUDING XML-TECHNOLOGY

Fig. 1. Structural scheme of base specialist preparation according to Software Engineering Track

- MAINTENANCE OF PERSONAL COMPUTERS
- STUDYING OF INFORMATION SERVICES AND COMMUNICATIONS IN BUSINESS
- STUDYING OF THE PRINCIPLES OF NETWORK FUNCTIONING
- STUDYING OF NETWORK PROTOCOLS

- DESIGN OF RELATIONAL DATABASE MANAGEMENT SYSTEMS
- NETWORK ARCHITECTURE AND NETWORK TYPES
- NETWORKS AND DATA TRANSMISSION
- REALIZATION OF NETWORK CELLULAR SYSTEM

- PRINCIPLES OF PROJECT MANAGEMENT AT SOFTWARE DEVELOPING
- TECHNOLOGIES OF COMPUTERS AND NETWORKS MANAGEMENT
- E-COMMERCE INFRASTRUCTURE AND DECISIONS ON BASE OF INTERNET FROM THE OF VIEW OF IS
- DESIGN OF THE PROTECTED NETWORK

- ADMINISTRATION OF A NETWORK OPERATION SYSTEM
- CREATION OF A DIRECTORY SERVICE INFRASTRUCTURE
- ADMINISTRATION OF DATABASES
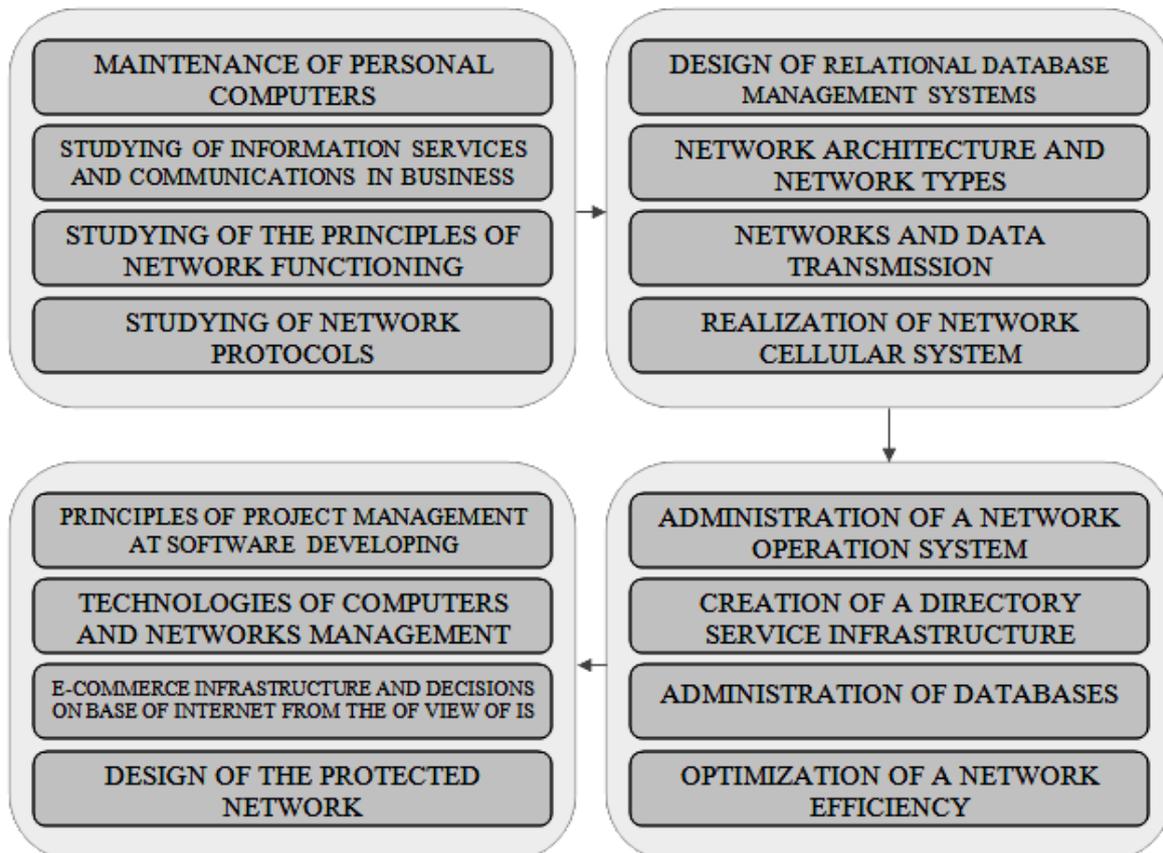- OPTIMIZATION OF A NETWORK EFFICIENCY

Fig. 2. Structural scheme of base specialist preparation according to Network Engineering Track
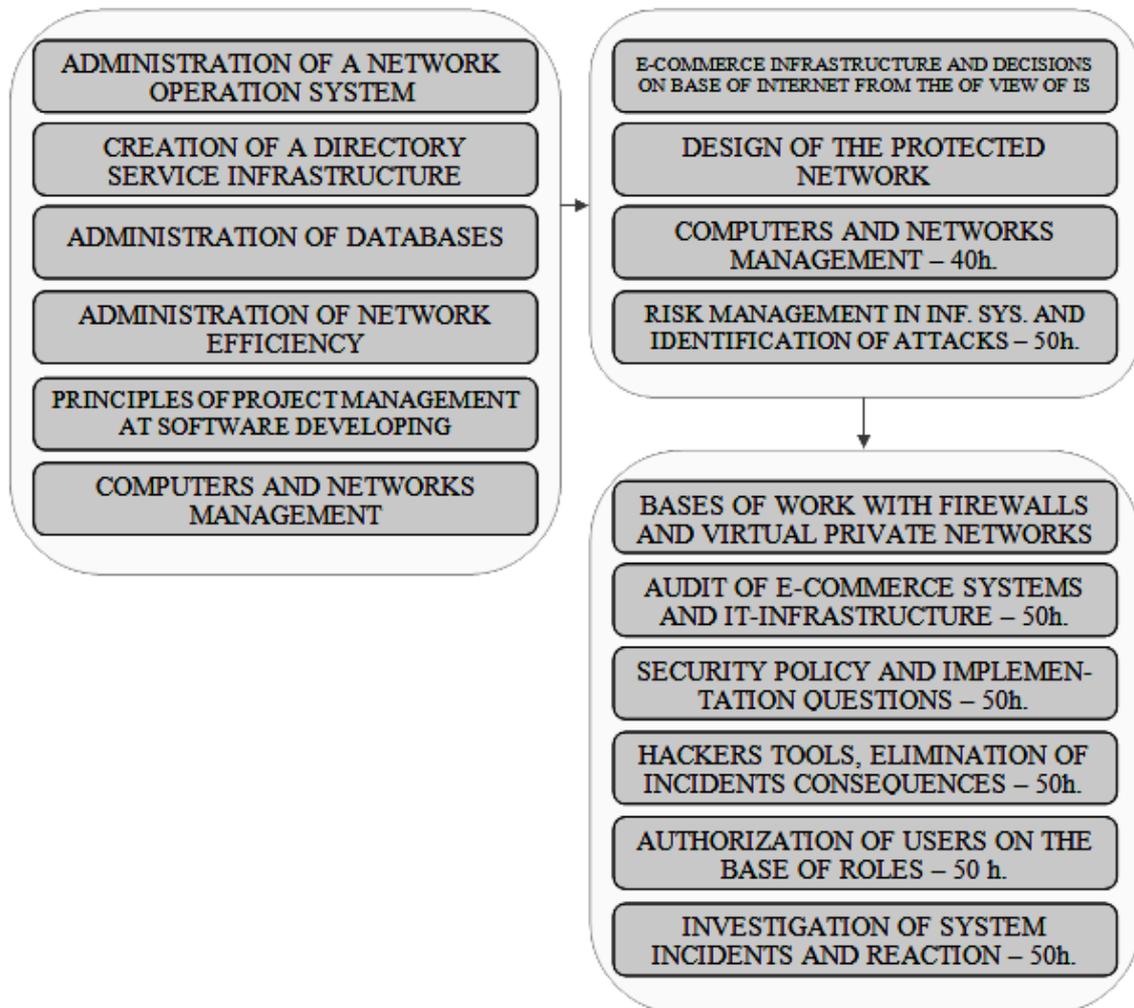
Fig. 3. Structural scheme of base specialist preparation according
to Advanced Network Information Security Engineering Track

Such requirements unfortunately are not fixed in the domestic educational standards and programs. Not all educational institution Ukraine which work in IS field (there are 30 of them) have the listed sets of standard software and hardware.

Conclusions

National traditions and also presence human recourses which have the high level of base knowledge's in the country create ideal conditions for development of the integral system of staff training in field information technologies security.

However the comparative analysis of temporal, educational and technical requirements to specialists preparation in foreign and domestic educational institutes is far not in our advantage.

It is necessary to notice that higher educational instututes which occupy an important role in the state system of education are frequently the little adapted for this purpose. The educationsl programs of institutes are traditionally oriented to the getting fundamental knowledges (which are surely important and inalienable part of specialist preparationf), but not able to compensate absence of ability of work with software products and technologies which are widely used in business today.

The programs of specialists preparation in information technologies field, as well as before, are based on theoretical, though specialized, disciplines, but not at all on practical knowledges of the use of the concrete systems and applications.

REFERENCES

1. *Yudin A. K.* Information security / A.K. Yudin, V. M. Bogush. — Kharkiv : Konsum. — 2005.

2. *Yudin A. K.* Analysis of information and telecommunication component support systems and decision making / A. K. Yudin, M. G. Lutskiy, I. E. Rogoza // Science-based technology. — 2013. — T. 16. — № 4.

3. *Meshchaninov O. P.* Current models of university education in Ukraine: monograph / O. P. Meshchaninov. — Nikolaev: Izd MSHU. Peter Graves. — 2005. — P. 130–196.