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|  | **Course Syllabus** |

**1.** **Course Title:**

**2. Academic Level:**

Master

Software and Hardware for IS

**3. ECTS Credits:**

5 ECTS

**4. Semester:**

1, autumn semester

**5. School/Department:**

Institute of Computer Technologies and Information Security

**6. Location:**

Bulding “G”, 347928, 44 Nekrasovsky Lane, Taganrog

**7. Instructor:**

Associate Prof. Dmitry Bespalov, email: dabespalov@sfedu.ru

**8. Language of Instruction:**

English

**9. Course Description:**

In this course, students study modern software and hardware platforms, principles of development of software complexes and elements of computer systems and learn to apply them in practice.

**10. Course Aims:**

To form knowledge, skills and abilities that are necessary to build a conceptual system of knowledge and skills for further practical application in the implementation of projects in the field of information and computer technologies during various types of industrial practice, including pre-graduate, in scientific and professional activities, and when writing a final qualification works.

**11. Specific entry requirements (if any):**

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**12. Course Content:**

**Module 1.** Fundamentals, structure and scope of information and automated systems.

IP and AC software.

Classification of software.

Types and types of information systems software.

IC and AC hardware.

Various modern hardware platforms.

Personal computers, mobile devices, embedded systems, wearable electronics, microcontrollers, programmable logic integrated circuits and special processors.

Industrial computers.

Server equipment and supercomputers.

Application of hardware and software platforms for solving applied problems.

Application of hardware and software platforms for solving scientific problems and modeling.

Software interfaces of information and automated systems.

Hardware communication interfaces of information and automated systems.

Ports, communication and peripheral devices.

Networking, local and global networks.

Cloud systems and access to remote resources.

Databases and information storage.

Principles of integration and interfacing of hardware and software systems.

Principles of compatibility.

High- and low-level communication protocols.

The life cycle of the software components of the IC and AS.

The life cycle of the IC and AC hardware platforms.

Principles of quality assurance of software and hardware of IS and AS.

Terms of reference for the project, quality assessment and control of the implementation of IP and AS projects.

**Module 2.** Basic principles of software and hardware development of IC and AC.

Software development tools for IS and AS.

Hardware development tools for IC and AC.

Intelligent technologies for providing IP and AS.

CASE-means of the upper and lower levels of IC and AC.

Functional models of IC and AC.

Information models of IS and AS.

Structural models of IC and AC.

A modern stack of technologies for the development of IS and AS software.

Compiled programming languages.

Interpreters.

Scripting languages of software development IS and AS.

Virtual machines and platforms.

Native software tools, tools and libraries of IC and AC.

Cross-platform tools, tools and libraries of IC and AC.

Modern hardware basis for the placement of IC and AC.

Network tools and cloud technologies of IP and AS.

Software and hardware means of information protection in IC and AS.

**13. Intended Learning Outcomes:**

Knowledge and skills of development and usage of software and hardware of various scales, the ability to use technical tools, algorithms and utilities, pairing methods and testing.

**14. Learning and Teaching Methods:**

Lectures, practical classes and workshops

**15. Methods of Assessment/Final assessment information:**

Assessment methods: interpretation, discussion, translation, test, reports, essays. Summative Assessment method: differentiated credit

**16. Reading List:**

1. Avdeev V.A. Computer organization and peripherals with demonstration of simulation models. – M.: DMK-Press, 2014. – 708 p.: ill. + CD. Visual learning. http://www.labirint.ru/authors/61996/

2. Avdeev V.A. Peripheral devices: interfaces, circuitry, programming. – M.: DMK-Press, 2014. – 848 p.: il. Vulture UMO. http://www.labirint.ru/authors/61996/

3. Avdeev V.A., Guzik V.F., Lyapuntsova E.V. Computer circuitry and programming in functional dialog models. – M.: FIZMATLIT, 2014. – 636 p.: ill. + CD. Visual learning

4. Microsoft documentation [electronic resource] https://docs.microsoft.com/ru-ru / (unlimited number).

5. Community materials [electronic resource] https://forum.lazarus .freepascal.org/index.php?PHPSESSID=k9nvosuacnkoc6m7lbe1esvts3&action=forum.

6. Pyatibratov A. P. Computing machines, networks and telecommunication systems. Educational and methodical complex / A.P. Pyatibratov; L.P. Gudyno; A.A.Kirichenko - Moscow: Eurasian Open Institute, 2009. - 292 p. http://biblioclub.ru/index.php?page=book&id=90949 (number unlimited).

7. Systems and networks of information transmission / Yu. Gromov - Tambov: Publishing house of FGBOU VPO "TSTU", 2012. - 128 p. http://biblioclub.ru/index.php?page=book&id=277938 (number unlimited).