

Curriculum Form

1. Name of the curriculum	Küberturbe tehnoloogiad
2. Name of the curriculum in English	Cyber Security Engineering
3. Level of higher education	Applied higher education
4. Form of study	Full-time study
5. Educational institution	Estonian Information Technology College (EITC?)
6. Study load (ECTS)	180 ECTS
7. Nominal duration of study	3 years
8. Curriculum group	Informatics and Information Technology
9. Curriculum code in EHIS	136817
10. Language of instruction	English
11. Other languages required for achieving the learning outcomes	-
12. Initial registration of the curriculum	-
13. Date of approval of this curriculum in the educational institution	18 December 2014
14. Pre-requisites for study	Certificate of Secondary Education or its equivalent; Minimum English proficiency Level B2 (CEFR); The exact prerequisites and requirements for admission will be provided by Admission Rules and Regulations of EITC.
15. The main field of study and its study load in ECTS	Cyber Security Engineering 180 ECTS (compulsory subjects 148 ECTS, incl. the diploma thesis 5 ECTS; elective subjects, incl. up to 18 ECTS of optional study)
16. Other modes of specialisation in the curriculum and their study load in ECTS	-
17. Curriculum aims and objectives	The curriculum is designed to provide higher education in the broad domain of Cyber Security, integrating Software Development and IT Systems Administration. Graduates of this curriculum will be able to independently design, operate and manage secure IT systems.
18. Curriculum learning outcomes	Upon completion of the curriculum students will - develop an understanding of the concept of the IT systems life cycle; - master the life-cycle of systems development as follows:

	<ul style="list-style-type: none"> • perform programming, testing, and distribution of an infosystem with focus on administration and security; • under supervision perform IS security testing based on standards and best practices; • apply the processes ensuring IS security and participate in the design and development of these systems; <p>- recognise the basics of IS administration, and administer development and testing environments; - adhere to the ethical norms of the field.</p>
19. Type of diploma or academic degree obtained upon graduation	Diploma of Applied Higher Education
20. Documents issued upon graduation	Diploma and Academic Transcript of Records
21. Curriculum content	<p>The curriculum comprises the following modules:</p> <ul style="list-style-type: none"> - Basic Skills and Competences (16 ECTS) - Basics of Infotehnology (24/6 ECTS) - IT Systems Development (38/51 ECTS) - IT Systems Administration (22/8 ECTS) - Cyber Security (16/26 ECTS) - Internship (27 ECTS) - Diploma Thesis (5 ECTS)
22. Completion of curriculum modes	Students will complete the curriculum on the basis of an individual study plan following the prescribed sequence of subjects (pre-requisites). Students can choose up to 10% of the elective subjects from other curricula.
23. Requirements for curriculum completion	To graduate, students must fulfil the curriculum total study load, including completion of all the compulsory subjects and defence of the diploma thesis.
24. Additional information	Inga.Vau@itcollege.ee

CURRICULUM MODULES: GOALS, OBJECTIVES AND LEARNING OUTCOMES

Module: Basic Skills and Competences		Study Load: 16 ECTS
Goals and objectives	The module is designed to support the acquisition of transferrable and entrepreneurial skills and competencies, and to develop an understanding of the social and ethical aspects of Information Technology.	
Learning outcomes	Upon completion of this module students will -have an overview of the social background of Information Technology and its integration with and impact on the other spheres of the society;	

	<ul style="list-style-type: none"> - recognise the role and consequences of field-related activities to the society in regard to ethical aspects; - master professional communication skills and information and communication technologies; - develop an understanding of the concept and basic principles of entrepreneurship, and the strategic and operative aspects of enterprise establishment and management.
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Module assessment

Subjects

Code*	Title	Study load(ECTS)
	Basics of Entrepreneurship	4
	Social, Ethical and Professional Issues in IT	4
	Oral and Written Communication Skills	4
	Statistics	4

Principles of selection: compulsory subjects

Module: Basics of Information Technology	Study Load: 24/6 ECTS
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Goals and objectives	The module is designed to support the development of a full understanding of the field of Information Technology and the acquisition of the basic skills and competencies for field-specific study.
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Learning outcomes	<p>Upon completion of this module students will</p> <ul style="list-style-type: none"> - develop an understanding of the general principles of Informatics, Computer Hardware and Network Engineering; - describe and compare different problems of Information Technology and provide solutions to these; - perform simpler tasks, including compiling and setting up hardware, connecting computers to network devices; - measure and analyse different quantitative parameters of a computer system; - evaluate functional and non-functional requirements of simple IT systems, including security, and by testing identify common system errors.
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Module assessment *

Subjects

Code*	Title	Study Load (ECTS)
	Introduction to Informatics and Computers	6
	Introduction to Information Security	4
	Logic and Discrete Mathematics	4
	Basic Networking	6
	Foundations of Software Testing	4
	Networking (elective subject)	6

Principles of selection: subject-based

Module: IT Systems Development		Study Load: 38/51 ECTS
Goals and objectives	The module is designed to support the acquisition of the skills and competencies required to operate in the life cycle of software development, including considered choices in the design and programming of the system.	
Learning outcomes	Upon completion of this module students will - program different devices and distribution systems by means of relevant methods and technologies; - perform IS analysis and describe system requirements; - apply different data structures and algorithms in imperative and functional programming languages; - use data bases for storing data in an infosystem by developing and integrating these with other layers of the system.	

Module assessment*

Subjects		
Code*	Title	Study Load (ECTS)
	Basic Programming	6
	Information System Analysis	3
	Database Processing	4
	Web Application Programming I	5
	Algorithms and Data Structures	5
	Automated Testing	4
	Functional Programming	3
	Configuration Management Systems	4
	Course Paper	4
	Elective subjects:	
	Distributed Systems	5
	Reverse Engineering	6
	Hardware Programming and SCADA	6
	Python	3
	Ruby	3
	Java Technologies	4
	Basics of C/C++ Programming	4
	C#	4
	Web Application Programming II	6
	Mobile App Programming	6
	Project Work	4

Principles of selection: subject-based

Module: IT Systems Administration		Scope: 22/8 ECTS
Goals and objectives	The module is designed to enable students to acquire the basic skills and competencies required for the development and administration of management and surveillance infosystems.	
Learning outcomes	Upon completion of this module students will - install test- and development environments to common operating	

	systems; - configure IT infrastructure services; - configure and administer infosystems surveillance systems; - identify problems in IT infrastructure and apply type solutions to these.	
Module assessment*		
Subject		
Code*	Title	Study Load (ECTS)
	Operating Systems	6
	Infrastructure Services	6
	Linux/Windows Administration	4
	Logging and Monitoring	6
	Elective Subjects:	
	Authentication and Authorization	4
	Firewalls and VPN/IPSec	4

Principles of selection: subject-based

Module: Cyber Security		Study Load: 16/26 ECTS
Goals and objectives	The module is designed to enable students to acquire the skills and competencies for the development of secure infosystems.	
Learning outcomes	Upon completion of this module students will - design secure infosystems; - consult the development team on infosystems security; - identify typical security flaws and risks in web applications; - develop an understanding of the integration of their work with different IT administration and development processes of the organisation; - recognise the role of human factor in infosystems security.	
Module assessment*		
Subjects		
Code*	Title	Study Load (ECTS)
	Web Application Security	6
	Secure Programming	4
	Governance and Management of Cyber Security	6
	Elective subjects:	
	System Design	5
	Network Security	4
	Intrusion Detection/Prevention Systems	4
	Digital Forensics (disk, network, host)	4
	Malware	3
	Incident Handling	3
	Social Engineering	3

Principles of selection: subject-based

Module: Optional Study	Study Load ≤
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	18 ECTS
Goals and objectives	For optional study, students can select interesting and beneficial subjects from other curricula.
Learning outcomes	Upon completion of a course of optional study students are expected to have achieved the learning outcomes of the subject.
Assessment*	

Principles of selection: up to 10% of the study load of the curriculum

Module: Internship		Study Load 27 ECTS
Goals and objectives	This module is designed to enable students to apply the theoretical knowledge, and practical skills and competences gained in their academic studies in the authentic field-related working environment. The tasks to be completed during internship will be further specified by the internship supervisor in compliance with Internship Rules and Regulations of EITC.	
Learning outcomes	<p>Upon completion of this module students will</p> <ul style="list-style-type: none"> - identify and apply relevant practices and methods for performing tasks and if necessary search for supplementary information; - collect and interpret field-specific information, and further explain and argue for the choices made and decisions taken; - document and analyse the knowledge, skills and experience gained in internship; - relate the knowledge and skills obtained at EITC to performing internship tasks in the working environment; - work both individually and in a team, and be open to diversity of opinions and values; - compile and defend a report of the internship. 	
Assessment*		

Principles of selection: compulsory module

Module: Diploma Thesis		Study Load 5 ECTS
Goals and objectives	The Diploma Thesis engages students in independent research work of applied nature developing their field-specific knowledge, professional skills and competences, dealing with an authentic field-related case or problem, involving analysis and methodology appropriate for finding solutions to the questions raised. The thesis should demonstrate student professional knowledge, proficiency of field-specific information and application of this information into practice, and adequate presentation and argumentation skills to support the solutions developed.	
Learning outcomes	<p>In the Diploma Thesis students are expected to</p> <ul style="list-style-type: none"> - postulate a research question and identify appropriate methodology and data sources to address it; - express and argue for their positions, supporting those with relevant 	

	<p>methodologies and practices;</p> <ul style="list-style-type: none"> - based on analysis, perform a task and solve a problem, develop solutions and formulate results; - formulate the diploma thesis in academically appropriate written style, register, lexis and grammar.
Assessment	The Diploma Thesis is assessed by a reviewer and diploma thesis defence committee in compliance with the established Assessment Matrix.

Principles of selection: compulsory module

**these sections are not compulsory; the educational institutions can complete these if relevant for their needs.*