



MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE  
NATIONAL TECHNICAL UNIVERSITY "KHARKIV POLYTECHNIC INSTITUTE"

KH-11251

# CURRICULUM

educational and professional program

APPROVED BY

Rector NTU "KhPI"



for the training first (bachelor's) level

(level of higher education)

by specialty

Cybersecurity

in the field of

knowledge

F

Information technologies

(code and name of the field of knowledge)

F5

Cybersecurity and information protection

Qualification

Bachelor of Cybersecurity  
and protection  
information

Period of study

3 years 10 months

on the basis of complete secondary education

Form of study

full-time

## I. Schedule of education process

| Course | September |   |   |   | October |   |   |   | November |    |    |    | December |    |    |    | January |    |    |    |    | February |    |    |    | March |    |    |    | April |    |    |    | May |    |    |    | June |    |    |    | July |    |    |    | August |    |    |    |    |    |   |   |  |
|--------|-----------|---|---|---|---------|---|---|---|----------|----|----|----|----------|----|----|----|---------|----|----|----|----|----------|----|----|----|-------|----|----|----|-------|----|----|----|-----|----|----|----|------|----|----|----|------|----|----|----|--------|----|----|----|----|----|---|---|--|
|        | 1         | 2 | 3 | 4 | 5       | 6 | 7 | 8 | 9        | 10 | 11 | 12 | 13       | 14 | 15 | 16 | 17      | 18 | 19 | 20 | 21 | 22       | 23 | 24 | 25 | 26    | 27 | 28 | 29 | 30    | 31 | 32 | 33 | 34  | 35 | 36 | 37 | 38   | 39 | 40 | 41 | 42   | 43 | 44 | 45 | 46     | 47 | 48 | 49 | 50 | 51 |   |   |  |
| I      | T         | T | T | T | T       | T | T | T | T        | T  | T  | T  | T        | T  | T  | T  | 3       | C  | C  | C  | K  | K        | K  | T  | T  | T     | T  | T  | T  | T     | T  | T  | T  | T   | T  | T  | T  | T    | T  | T  | 3  | C    | C  | C  | K  | K      | K  | K  | K  | K  | K  | K | K |  |
| II     | T         | T | T | T | T       | T | T | T | T        | T  | T  | T  | T        | T  | T  | T  | 3       | C  | C  | C  | K  | K        | K  | T  | T  | T     | T  | T  | T  | T     | T  | T  | T  | T   | T  | T  | T  | T    | T  | T  | 3  | C    | C  | C  | K  | K      | K  | K  | K  | K  | K  | K | K |  |
| III    | T         | T | T | T | T       | T | T | T | T        | T  | T  | T  | T        | T  | T  | T  | 3       | C  | C  | C  | K  | K        | K  | T  | T  | T     | T  | T  | T  | T     | T  | T  | T  | T   | T  | T  | T  | T    | T  | T  | 3  | C    | C  | C  | K  | K      | K  | K  | K  | K  | K  | K | K |  |
| IV     | T         | T | T | T | T       | T | T | T | T        | T  | T  | T  | T        | T  | T  | T  | 3       | C  | C  | C  | K  | K        | K  | T  | T  | T     | T  | T  | T  | T     | T  | T  | T  | T   | T  | T  | T  | T    | T  | T  | T  | 3    | C  | C  | A  | A      |    |    |    |    |    |   |   |  |

Notation:



Theoretical training

3 Score week

C Examination session



Theoretical and practical training

P Practice



A Protection of the control work



K Vacations

## II. Consolidated budget time (in weeks)

| Course | Theoretical study | Exam Session | Practice | Attestation | Preparation of qualification work | Vacation | Total |
|--------|-------------------|--------------|----------|-------------|-----------------------------------|----------|-------|
| I      | 32                | 8            |          |             |                                   | 12       | 52    |
| II     | 32                | 8            |          |             |                                   | 12       | 52    |
| III    | 28                | 8            | 4        |             |                                   | 12       | 52    |
| IV     | 28                | 6            | 4        | 2           |                                   | 3        | 43    |
| Total  | 120               | 30           | 8        | 2           |                                   | 39       | 199   |

## III. Practice

| Type of practice | Duration (in weeks) | Semester |
|------------------|---------------------|----------|
| Practice         |                     |          |
| Industrial       | 4                   | 6        |
| Technological    | 4                   | 8        |
|                  |                     |          |

## IV. Attestation

| Certification form                            | Semester |
|-----------------------------------------------|----------|
| Defense of qualification work                 |          |
| Preparation for the Unified State Examination | 8        |
| Unified state qualification exam              | 8        |

**CURRICULUM CONTENT**  
training of the first (bachelor's) level: by specialty

F5 Cybersecurity and information protection

| № 3/n  | Name of the educational component                                                                     | Total number |        |           |        | Departmen<br>t code |
|--------|-------------------------------------------------------------------------------------------------------|--------------|--------|-----------|--------|---------------------|
|        |                                                                                                       | ECTS credits | Hours  | Semesters |        |                     |
|        |                                                                                                       |              |        | exam.     | offset |                     |
| 1      | 2                                                                                                     | 3            | 4      | 5         | 6      | 7                   |
| 1      | Obligatory educational components                                                                     | 159,0        | 4770,0 |           |        | 66,25%              |
| 1.1    | General training                                                                                      | 53,0         | 1590,0 |           |        | 22,08%              |
| 3П 1   | History and culture of Ukraine                                                                        | 4,0          | 120,0  | 1         |        | 310                 |
| 3П 2   | Foreign Language                                                                                      | 4,0          | 120,0  | 8         | 7      | 275                 |
| 3П 3   | Ukrainian as a foreign language                                                                       | 12,0         | 360,0  | 8         | 3 - 7  | 273                 |
| 3П 4   | Physics                                                                                               | 4,0          | 120,0  | 1         |        | 168                 |
| 3П 5   | Fundamentals of humanitarian and philosophical knowledge in professional activity                     | 4,0          | 120,0  | 3         |        | 307                 |
| 3П 6   | Higher mathematics                                                                                    | 6,0          | 180,0  |           | 1      | 324                 |
| 3П 7   | Higher mathematics                                                                                    | 5,0          | 150,0  | 2         |        | 324                 |
| 3П 8   | Language of professional training                                                                     | 10,0         | 300,0  | 2         | 1      | 275                 |
| 3П     | Physical education                                                                                    | 4,0          | 120,0  |           | 1 - 2  | 302                 |
| 1.2    | Professional training                                                                                 | 106,0        | 3180,0 |           |        | 44,17%              |
| СП 1   | Introduction to the specialty. Introductory practice                                                  | 3,0          | 90,0   |           | 1      | 328                 |
| СП 2   | Basics of programming                                                                                 | 4,0          | 120,0  | 1         |        | 328                 |
| СП 3   | Information and coding theory                                                                         | 3,0          | 90,0   | 1         |        | 328                 |
| СП 4   | Legal regulation of cybersecurity                                                                     | 4,0          | 120,0  |           | 2      | 328                 |
| СП 5   | Algorithms and data structures                                                                        | 5,0          | 150,0  | 2         |        | 328                 |
| СП 6   | Physical bases of technical intelligence means                                                        | 5,0          | 150,0  |           | 2      | 328                 |
| СП 7   | Information security of the state                                                                     | 3,0          | 90,0   |           | 2      | 328                 |
| СП 8   | Fundamentals of social engineering                                                                    | 4,0          | 120,0  |           | 3      | 328                 |
| СП 9   | Mathematical foundations of cryptology                                                                | 4,0          | 120,0  | 3         |        | 328                 |
| СП 10  | Programming technologies                                                                              | 5,0          | 150,0  | 3         |        | 328                 |
| СП 11  | Computer networks                                                                                     | 4,0          | 120,0  | 3         |        | 328                 |
| СП 12  | Operating system architecture and security                                                            | 6,0          | 180,0  | 4         |        | 328                 |
| СП 13  | Programming tools                                                                                     | 6,0          | 180,0  | 4         |        | 328                 |
| СП 14  | Basics of cryptographic protection                                                                    | 6,0          | 180,0  |           | 4      | 328                 |
| СП 15  | Fundamentals of building and protecting microprocessor systems                                        | 4,0          | 120,0  | 5         |        | 328                 |
| СП 16  | Fundamentals of mathematical modelling of security systems                                            | 4,0          | 120,0  | 5         |        | 328                 |
| СП 17  | Basics of steganographic information protection                                                       | 5,0          | 150,0  | 5         |        | 328                 |
| СП 18  | Security in information and communication systems                                                     | 4,0          | 120,0  |           | 5      | 328                 |
| СП 19  | Web application development                                                                           | 6,0          | 180,0  | 6         |        | 328                 |
| СП 20  | Integrated information security systems                                                               | 5,0          | 150,0  | 7         |        | 328                 |
| СП 21  | Web security                                                                                          | 5,0          | 150,0  | 7         |        | 328                 |
| СП 22  | Comprehensive training                                                                                | 4,0          | 120,0  |           | 8      | 328                 |
| СП 23  | Antivirus protection of information                                                                   | 4,0          | 120,0  |           | 8      | 328                 |
| СП 24  | Machine learning basics for cybersecurity                                                             | 3,0          | 90,0   |           | 8      | 328                 |
| 2      | Professional training                                                                                 | 12,0         | 360,0  |           |        | 5,00%               |
| ПП 1   | Industrial practice*                                                                                  | 6,0          | 180,0  |           | 6      | 328                 |
| ПП 2   | Technological practice*                                                                               | 6,0          | 180,0  |           | 8      | 328                 |
| 3      | Attestation*                                                                                          | 3,0          | 90,0   |           |        | 1,25%               |
| 4      | Optional educational components                                                                       | 66,0         | 1980,0 |           |        | 27,50%              |
| 4.1    | Specialized training                                                                                  | 23,0         | 690,0  |           |        | 9,58%               |
| 4.1.1  | Profiled package of educational components 01 "Artificial Intelligence in Security Systems"           | 23,0         | 690,0  |           |        |                     |
| БП1.1  | Ethical hacking                                                                                       | 3,0          | 90,0   | 4         |        | 328                 |
| БП1.2  | Date of mining                                                                                        | 3,0          | 90,0   | 4         |        | 328                 |
| БП1.3  | Mathematical foundations of artificial intelligence                                                   | 3,0          | 90,0   | 5         |        | 328                 |
| БП1.4  | Python for artificial intelligence and machine learning                                               | 4,0          | 120,0  | 6         |        | 328                 |
| БП1.5  | Genetic algorithms                                                                                    | 4,0          | 120,0  | 7         |        | 328                 |
| БП1.6  | Python for internet things                                                                            | 3,0          | 90,0   | 8         |        | 328                 |
| БП1.7  | Systems engineering                                                                                   | 3,0          | 90,0   | 8         |        | 328                 |
| 4.1.2  | Profiled package of educational components 02 "Blockchain technology and security of banking systems" | 23,0         | 690,0  |           |        |                     |
| БП2.1  | Decentralised systems                                                                                 | 3,0          | 90,0   | 4         |        | 328                 |
| БП2.2  | Risk management                                                                                       | 3,0          | 90,0   | 4         |        | 328                 |
| БП2.3  | Blockchain: basics and application examples                                                           | 3,0          | 90,0   | 5         |        | 328                 |
| БП2.4  | Security of banking systems                                                                           | 4,0          | 120,0  | 6         |        | 328                 |
| БП2.5  | Protecting critical infrastructure facilities                                                         | 4,0          | 120,0  | 7         |        | 328                 |
| БП2.6  | Organising document management with restricted access                                                 | 3,0          | 90,0   | 8         |        | 328                 |
| БП2.7  | Security in social networks                                                                           | 3,0          | 90,0   | 8         |        | 328                 |
| 4.1.3  | Profiled package of educational components в 03 "Innovation Campus"                                   | 23,0         | 690,0  |           |        |                     |
| БП3.1  | Basics of cybersecurity                                                                               | 3,0          | 90,0   | 4         |        | 328                 |
| БП3.2  | Development of corporate information systems (part 1)                                                 | 3,0          | 90,0   | 4         |        | 328                 |
| БП3.3  | Development of corporate information systems (part 2)                                                 | 3,0          | 90,0   | 5         |        | 328                 |
| БП3.4  | Databases for corporate information systems                                                           | 4,0          | 120,0  | 6         |        | 328                 |
| БП3.5  | Architecture of corporate information systems                                                         | 4,0          | 120,0  | 7         |        | 328                 |
| БП3.6  | Security and audit of wireless and mobile networks                                                    | 3,0          | 90,0   | 8         |        | 328                 |
| БП3.7  | Protecting critical infrastructure facilities                                                         | 3,0          | 90,0   | 8         |        | 328                 |
| 4.2    | Educational components of free choice of professional training of the general institute catalog       | 28,0         | 840,0  |           |        | 42,42%              |
| ОКБП 1 | ОК БВ ПК 1                                                                                            | 4,0          | 120,0  |           | 3      | 777                 |
| ОКБП 2 | ОК БВ ПК 2                                                                                            | 4,0          | 120,0  |           | 4      | 777                 |
| ОКБП 3 | ОК БВ ПК 3                                                                                            | 4,0          | 120,0  |           | 5      | 777                 |
| ОКБП 4 | ОК БВ ПК 4                                                                                            | 4,0          | 120,0  |           | 6      | 777                 |
| ОКБП 5 | ОК БВ ПК 5                                                                                            | 4,0          | 120,0  |           | 6      | 777                 |
| ОКБП 6 | ОК БВ ПК 6                                                                                            | 4,0          | 120,0  |           | 7      | 777                 |
| ОКБП 7 | ОК БВ ПК 7                                                                                            | 4,0          | 120,0  |           | 7      | 777                 |
| 4.3    | Educational components of the free choice of the university-wide catalog                              | 12,0         | 360,0  |           |        | 18,18%              |
| ОКБ3 1 | ОК БВ 3П 1                                                                                            | 4,0          | 120,0  |           | 5      | 777                 |
| ОКБ3 2 | ОК БВ 3П 2                                                                                            | 4,0          | 120,0  |           | 6      | 777                 |
| ОКБ3 3 | ОК БВ 3П 3                                                                                            | 4,0          | 120,0  |           | 7      | 777                 |
| 4.4    | Educational components of special university choice                                                   | 3,0          | 90,0   |           |        | 4,55%               |
| ОКБВУ  | ОКБВУ                                                                                                 | 3,0          | 90,0   |           | 3      | 777                 |
|        | Total for education period                                                                            | 240,0        | 7200,0 |           |        |                     |

|                                                  |                                                             |
|--------------------------------------------------|-------------------------------------------------------------|
| <b>CURRICULUM №</b>                              | <b>KH-1125i</b>                                             |
| <b>Form of study and more</b>                    | <b>i</b>                                                    |
| <b>Institute code</b>                            | <b>320</b>                                                  |
| <b>Short name of the institute</b>               | <b>KH</b>                                                   |
|                                                  |                                                             |
|                                                  |                                                             |
| <b>Number of the educational program</b>         | <b>11</b>                                                   |
| <b>Name of the educational program</b>           | <b>Cybersecurity</b>                                        |
| <b>Code of the field of knowledge</b>            | <b>F</b>                                                    |
| <b>Industry name</b>                             | <b>Information technologies</b>                             |
| <b>Specialty code</b>                            | <b>F5</b>                                                   |
| <b>Name of the specialty</b>                     | <b>Cybersecurity and information protection</b>             |
|                                                  |                                                             |
|                                                  |                                                             |
| <b>Level of higher education:</b>                | <b>first (bachelor's) level</b>                             |
| <b>Qualifications:</b>                           | <b>Bachelor of Cybersecurity and information protection</b> |
|                                                  |                                                             |
|                                                  |                                                             |
| <b>Year (last 2 digits)</b>                      | <b>25</b>                                                   |
|                                                  |                                                             |
| <b>Responsible for information, phone number</b> | <b>Serhii YEVSEIEV, 095-360-66-13</b>                       |

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# V. EDUCATION PROCESS PLAN

KH-11251

| Code in accordance with the EPP | Name of academic discipline                                                       | Semester distribution |              |                  | Number of ECTS credits | Number of hours |                                 |                 |              |                 |                  | Distribution of classroom hours per a week and ECTS credits per a semester |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | Department |    |
|---------------------------------|-----------------------------------------------------------------------------------|-----------------------|--------------|------------------|------------------------|-----------------|---------------------------------|-----------------|--------------|-----------------|------------------|----------------------------------------------------------------------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|-----------------|--------------|------|------|-----------|------|------|------|------------|----|
|                                 |                                                                                   | Exams                 | Tests        | Individual tasks |                        | Total amount    | Classroom                       |                 |              |                 | Independent work | I course                                                                   |              |                 |              | II course       |              |                 |              | III course      |              |      |      | IV course |      |      |      |            |    |
|                                 |                                                                                   |                       |              |                  |                        |                 | including                       |                 |              |                 |                  | S e m e s t e r s                                                          |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      |            |    |
|                                 |                                                                                   |                       |              |                  |                        |                 | 1                               |                 | 2            |                 |                  | 3                                                                          |              | 4               |              | 5               |              | 6               |              | 7               |              | 8    |      |           |      |      |      |            |    |
|                                 |                                                                                   |                       |              |                  |                        |                 | Number of weeks in the semester |                 |              |                 |                  |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      |            |    |
|                                 |                                                                                   |                       |              |                  |                        |                 | 16                              |                 | 16           |                 |                  | 16                                                                         |              | 16              |              | 16              |              | 12              |              | 16              |              | 12   |      |           |      |      |      |            |    |
| Classroom hours                 | ECTS credits                                                                      | Classroom hours       | ECTS credits | Classroom hours  | ECTS credits           | Classroom hours | ECTS credits                    | Classroom hours | ECTS credits | Classroom hours | ECTS credits     | Classroom hours                                                            | ECTS credits | Classroom hours | ECTS credits | Classroom hours | ECTS credits | Classroom hours | ECTS credits | Classroom hours | ECTS credits |      |      |           |      |      |      |            |    |
| 1                               | 2                                                                                 | 3                     | 4            | 5                | 6                      | 7               | 8                               | 9               | 10           | 11              | 12               | 13                                                                         | 14           | 15              | 16           | 17              | 18           | 19              | 20           | 21              | 22           | 23   | 24   | 25        | 26   | 27   | 28   | 29         |    |
| 1                               | Obligatory educational components                                                 |                       |              |                  | 159,0                  | 4770,0          | 2052,0                          | 736,0           | 684,0        | 632,0           | 2718,0           | 24,0                                                                       | 30,0         | 25,0            | 30,0         | 18,0            | 23,0         | 17,0            | 20,0         | 15,0            | 19,0         | 8,0  | 8,0  | 12,0      | 14,0 | 15,0 | 15,0 |            |    |
| 1.1                             | General training                                                                  |                       |              |                  | 53,0                   | 1590,0          | 744,0                           | 144,0           |              | 600,0           | 846,0            | 17,0                                                                       | 20,0         | 12,0            | 13,0         | 5,0             | 6,0          | 2,0             | 2,0          | 2,0             | 2,0          | 2,0  | 2,0  | 4,0       | 4,0  | 4,0  | 4,0  |            |    |
| 3П 1                            | History and culture of Ukraine                                                    | 1                     |              | A                | 4,0                    | 120,0           | 48,0                            | 16,0            |              | 32,0            | 72,0             | 3                                                                          | 4            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 31         |    |
| 3П 2                            | Foreign Language                                                                  | 8                     | 7            |                  | 4,0                    | 120,0           | 56,0                            |                 |              | 56,0            | 64,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      | 2         | 2    | 2    | 2    | 27         |    |
| 3П 3                            | Ukrainian as a foreign language                                                   | 8                     | 3 - 7        | A                | 12,0                   | 360,0           | 176,0                           |                 |              | 176,0           | 184,0            |                                                                            |              |                 |              | 2               | 2            | 2               | 2            | 2               | 2            | 2    |      | 2         | 2    | 2    | 2    | 27         |    |
| 3П 4                            | Physics                                                                           | 1                     |              | C                | 4,0                    | 120,0           | 48,0                            | 32,0            |              | 16,0            | 72,0             | 3                                                                          | 4            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 16         |    |
| 3П 5                            | Fundamentals of humanitarian and philosophical knowledge in professional activity | 3                     |              | A                | 4,0                    | 120,0           | 48,0                            | 16,0            |              | 32,0            | 72,0             |                                                                            |              |                 |              | 3               | 4            |                 |              |                 |              |      |      |           |      |      |      | 30         |    |
| 3П 6                            | Higher mathematics                                                                |                       | 1            | C                | 6,0                    | 180,0           | 80,0                            | 32,0            |              | 48              | 100,0            | 5                                                                          | 6            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| 3П 7                            | Higher mathematics                                                                | 2                     |              | A                | 5,0                    | 150,0           | 80,0                            | 48,0            |              | 32,0            | 70,0             |                                                                            |              | 5               | 5            |                 |              |                 |              |                 |              |      |      |           |      |      |      |            |    |
| 3П 8                            | Language of professional training                                                 | 2                     | 1            | A                | 10,0                   | 300,0           | 144,0                           |                 |              | 144,0           | 156,0            | 4                                                                          | 4            | 5               | 6            |                 |              |                 |              |                 |              |      |      |           |      |      |      | 27         |    |
| 3П                              | Physical education                                                                |                       | 1 - 2        |                  | 4,0                    | 120,0           | 64,0                            |                 |              | 64,0            | 56,0             | 2,0                                                                        | 2,0          | 2,0             | 2,0          |                 |              |                 |              |                 |              |      |      |           |      |      |      | 30         |    |
| 1.2                             | Professional training                                                             |                       |              |                  | 106,0                  | 3180,0          | 1308,0                          | 592,0           | 684,0        | 32,0            | 1872,0           | 7,0                                                                        | 10,0         | 13,0            | 17,0         | 13,0            | 17,0         | 15,0            | 18,0         | 13,0            | 17,0         | 6,0  | 6,0  | 8,0       | 10,0 | 11,0 | 11,0 |            |    |
| CP 1                            | Introduction to the specialty. Introductory practice                              |                       | 1            |                  | 3,0                    | 90,0            | 32,0                            | 16              |              | 16              | 58,0             | 2                                                                          | 3            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 2                            | Basics of programming                                                             | 1                     |              |                  | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             | 3                                                                          | 4            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 3                            | Information and coding theory                                                     | 1                     |              |                  | 3,0                    | 90,0            | 32,0                            | 16              | 16           |                 | 58,0             | 2                                                                          | 3            |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 4                            | Legal regulation of cybersecurity                                                 |                       | 2            |                  | 4,0                    | 120,0           | 48,0                            | 32              |              | 16              | 72,0             |                                                                            |              | 3               | 4            |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 5                            | Algorithms and data structures                                                    | 2                     |              |                  | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              | 4               | 5            |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 6                            | Physical bases of technical intelligence means                                    |                       | 2            |                  | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              | 4               | 5            |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 7                            | Information security of the state                                                 |                       | 2            |                  | 3,0                    | 90,0            | 32,0                            | 16              | 16           |                 | 58,0             |                                                                            |              | 2               | 3            |                 |              |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 8                            | Fundamentals of social engineering                                                |                       | 3            |                  | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             |                                                                            |              |                 |              | 3               | 4            |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 9                            | Mathematical foundations of cryptology                                            | 3                     |              |                  | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             |                                                                            |              |                 |              | 3               | 4            |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 10                           | Programming technologies                                                          | 3                     |              |                  | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              |                 |              | 4               | 5            |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 11                           | Computer networks                                                                 | 3                     |              | CP               | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             |                                                                            |              |                 |              | 3               | 4            |                 |              |                 |              |      |      |           |      |      |      | 32         |    |
| CP 12                           | Operating system architecture and security                                        | 4                     |              |                  | 6,0                    | 180,0           | 80,0                            | 32              | 48           |                 | 100,0            |                                                                            |              |                 |              |                 |              | 5               | 6            |                 |              |      |      |           |      |      |      | 32         |    |
| CP 13                           | Programming tools                                                                 | 4                     |              |                  | 6,0                    | 180,0           | 80,0                            | 32              | 48           |                 | 100,0            |                                                                            |              |                 |              |                 |              | 5               | 6            |                 |              |      |      |           |      |      |      | 32         |    |
| CP 14                           | Basics of cryptographic protection                                                |                       | 4            |                  | 6,0                    | 180,0           | 80,0                            | 32              | 48           |                 | 100,0            |                                                                            |              |                 |              |                 |              | 5               | 6            |                 |              |      |      |           |      |      |      | 32         |    |
| CP 15                           | Fundamentals of building and protecting microprocessor systems                    | 5                     |              |                  | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             |                                                                            |              |                 |              |                 |              |                 |              | 3               | 4            |      |      |           |      |      |      | 32         |    |
| CP 16                           | Fundamentals of mathematical modelling of security systems                        | 5                     |              |                  | 4,0                    | 120,0           | 48,0                            | 16              | 32           |                 | 72,0             |                                                                            |              |                 |              |                 |              |                 |              | 3               | 4            |      |      |           |      |      |      | 32         |    |
| CP 17                           | Basics of steganographic information protection                                   | 5                     |              |                  | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              |                 |              |                 |              |                 |              | 4               | 5            |      |      |           |      |      |      | 32         |    |
| CP 18                           | Security in information and communication systems                                 |                       | 5            |                  | 4,0                    | 120,0           | 48,0                            | 32              | 16           |                 | 72,0             |                                                                            |              |                 |              |                 |              |                 |              | 3               | 4            |      |      |           |      |      |      | 32         |    |
| CP 19                           | Web application development                                                       | 6                     |              | CP               | 6,0                    | 180,0           | 72,0                            | 36              | 36           |                 | 108,0            |                                                                            |              |                 |              |                 |              |                 |              |                 |              | 6    | 6    |           |      |      |      | 32         |    |
| CP 20                           | Integrated information security systems                                           | 7                     |              |                  | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      | 4         | 5    |      |      | 32         |    |
| CP 21                           | Web security                                                                      | 7                     |              | CP               | 5,0                    | 150,0           | 64,0                            | 32              | 32           |                 | 86,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      | 4    | 5    | 32         |    |
| CP 22                           | Comprehensive training                                                            |                       | 8            | A                | 4,0                    | 120,0           | 48,0                            | 24              | 24           |                 | 72,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      | 4    | 4          | 32 |
| CP 23                           | Antivirus protection of information                                               |                       | 8            |                  | 4,0                    | 120,0           | 48,0                            | 24              | 24           |                 | 72,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      | 4    | 4          | 32 |
| CP 24                           | Machine learning basics for cybersecurity                                         |                       | 8            |                  | 3,0                    | 90,0            | 36,0                            | 12              | 24           |                 | 54,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      | 3    | 3    | 32         |    |
| 2                               | Professional training                                                             |                       |              |                  | 12,0                   | 360,0           |                                 |                 |              |                 | 360,0            |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 6,0        |    |
| ПП 1                            | Industrial practice*                                                              |                       | 6            |                  | 6,0                    | 180,0           |                                 |                 |              |                 | 180,0            |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      |            | 32 |
| ПП 2                            | Technological practice*                                                           |                       | 8            |                  | 6,0                    | 180,0           |                                 |                 |              |                 | 180,0            |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 6,0        | 32 |
| 3                               | Attestation*                                                                      |                       |              |                  | 3,0                    | 90,0            |                                 |                 |              |                 | 90,0             |                                                                            |              |                 |              |                 |              |                 |              |                 |              |      |      |           |      |      |      | 3,0        | 32 |
| 4                               | Optional educational components                                                   |                       |              |                  | 66,0                   | 1980,0          | 772,0                           | 156,0           | 240,0        |                 | 1208,0           |                                                                            |              |                 |              | 7,0             | 7,0          | 7,0             | 10,0         | 8,0             | 11,0         | 13,0 | 16,0 | 12,0      | 16,0 | 6,0  | 6,0  |            |    |
| 4.1                             | Specialized training                                                              |                       |              |                  | 23,0                   | 690,0           | 264,0                           | 112,0           | 152,0        |                 | 426,0            |                                                                            |              |                 |              |                 |              | 4,0             | 6,0          | 2,0             | 3,0          | 4,0  | 4,0  | 3,0       | 4,0  | 6,0  | 6,0  |            |    |

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|                                    | 1                                                                                                     | 2 | 3 | 4 | 5 | 6     | 7      | 8      | 9     | 10    | 11    | 12     | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   | 21   | 22   | 23   | 24   | 25   | 26   | 27  | 28 | 29  |     |
|------------------------------------|-------------------------------------------------------------------------------------------------------|---|---|---|---|-------|--------|--------|-------|-------|-------|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|----|-----|-----|
| 4.1.1                              | Provided package of educational components B1 "Artificial Intelligence in Security Systems"           |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| B11.1                              | Ethical hacking                                                                                       | 4 |   |   |   | 23.0  | 90.0   | 264.0  | 112.0 | 162.0 |       | 728.0  |      |      |      |      |      | 4.0  | 6.0  | 2.0  | 3.0  | 4.0  | 4.0  | 2.0  | 4.0  | 3.0  | 4.0 |    |     |     |
| B11.2                              | Date of mining                                                                                        | 4 |   |   |   | 3.0   | 90.0   | 32.0   | 16    | 16    |       | 56.0   |      |      |      |      |      | 2    | 3    |      |      |      |      |      |      |      |     |    | 128 |     |
| B11.3                              | Mathematical foundations of artificial intelligence                                                   | 5 |   |   |   | 3.0   | 90.0   | 32.0   | 16    | 16    |       | 56.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    | 128 |     |
| B11.4                              | Python for artificial intelligence and machine learn                                                  | 6 |   |   |   | 4.0   | 120.0  | 48.0   | 24    | 24    |       | 72.0   |      |      |      |      |      |      |      | 2    | 3    |      | 4    | 4    |      |      |     |    | 128 |     |
| B11.5                              | Genetic algorithms                                                                                    | 7 |   |   |   | 4.0   | 120.0  | 48.0   | 16    | 12    |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      |      | 3    | 4    |     |    | 128 |     |
| B11.6                              | Python for internet things                                                                            | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12    | 24    |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   | 3  | 128 |     |
| B11.7                              | Systems engineering                                                                                   | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12    | 24    |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   | 3  | 128 |     |
| 4.1.2                              | Provided package of educational components B2 "Blockchain technology and security of banking systems" |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| B12.1                              | Decentralised systems                                                                                 | 4 |   |   |   | 3.0   | 90.0   | 32.0   | 16.0  | 16.0  |       | 56.0   |      |      |      |      |      | 2    | 3    |      |      |      |      |      |      |      |     |    | 128 |     |
| B12.2                              | Risk management                                                                                       | 4 |   |   |   | 3.0   | 90.0   | 32.0   | 16.0  | 16.0  |       | 56.0   |      |      |      |      |      | 2    | 3    |      |      |      |      |      |      |      |     |    | 128 |     |
| B12.3                              | Blockchain: basics and application examples                                                           | 5 |   |   |   | 3.0   | 90.0   | 32.0   | 16.0  | 16.0  |       | 56.0   |      |      |      |      |      |      |      |      | 2    | 3    |      |      |      |      |     |    | 128 |     |
| B12.4                              | Security of banking systems                                                                           | 6 |   |   |   | 4.0   | 120.0  | 48.0   | 24.0  | 24.0  |       | 72.0   |      |      |      |      |      |      |      |      |      | 2    | 3    |      | 4    | 4    |     |    | 128 |     |
| B12.5                              | Protecting critical infrastructure facilities                                                         | 7 |   |   |   | 4.0   | 120.0  | 48.0   | 16.0  | 12.0  |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      |      |      | 3    | 4   |    | 128 |     |
| B12.6                              | Organising document management with restricted                                                        | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12.0  | 24.0  |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   | 3  | 128 |     |
| B12.7                              | Security in social networks                                                                           | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12.0  | 24.0  |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   | 3  | 128 |     |
| 4.1.3                              | Provided package of educational components B3 "Innovation Certifica"                                  |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| B13.1                              | Basics of cybersecurity                                                                               | 4 |   |   |   | 3.0   | 90.0   | 32.0   | 16    | 16    |       | 56.0   |      |      |      |      |      |      | 2    | 3    |      |      |      |      |      |      |     |    | 128 |     |
| B13.2                              | Development of corporate information systems (part 1)                                                 | 4 |   |   |   | 3.0   | 90.0   | 32.0   | 16    | 16    |       | 56.0   |      |      |      |      |      |      | 2    | 3    |      |      |      |      |      |      |     |    | 128 |     |
| B13.3                              | Development of corporate information systems (part 2)                                                 | 5 |   |   |   | 3.0   | 90.0   | 32.0   | 16    | 16    |       | 56.0   |      |      |      |      |      |      |      |      | 2    | 3    |      |      |      |      |     |    | 128 |     |
| B13.4                              | Databases for corporate information systems                                                           | 6 |   |   |   | 4.0   | 120.0  | 48.0   | 24    | 24    |       | 72.0   |      |      |      |      |      |      |      |      |      |      | 4    | 4    |      |      |     |    | 128 |     |
| B13.5                              | Architecture of corporate information systems                                                         | 7 |   |   |   | 4.0   | 120.0  | 48.0   | 16    | 32    |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      | 3    | 4    |      |     |    | 128 |     |
| B13.6                              | Security and audit of wireless and mobile networks                                                    | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12    | 24    |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      | 3   | 3  | 128 |     |
| B13.7                              | Protecting critical infrastructure facilities                                                         | 8 |   |   |   | 3.0   | 90.0   | 36.0   | 12    | 24    |       | 54.0   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     | 3  | 3   | 128 |
| 4.2                                | Educational components of free choice of professional training of the general institute catalog       |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| OKBN1                              | OK BB FN 1                                                                                            | 3 |   |   |   | 4.0   | 120.0  | 48.0   |       |       |       | 72.0   |      |      |      |      |      | 3    | 4    |      |      |      |      |      |      |      |     |    | 777 |     |
| OKBN2                              | OK BB FN 2                                                                                            | 4 |   |   |   | 4.0   | 120.0  | 48.0   |       |       |       | 72.0   |      |      |      |      |      |      | 3    | 4    |      |      |      |      |      |      |     |    | 777 |     |
| OKBN3                              | OK BB FN 3                                                                                            | 5 |   |   |   | 4.0   | 120.0  | 48.0   |       |       |       | 72.0   |      |      |      |      |      |      |      |      | 3    | 4    |      |      |      |      |     |    | 777 |     |
| OKBN4                              | OK BB FN 4                                                                                            | 6 |   |   |   | 4.0   | 120.0  | 36.0   |       |       |       | 84.0   |      |      |      |      |      |      |      |      |      |      | 3    | 4    |      |      |     |    | 777 |     |
| OKBN5                              | OK BB FN 5                                                                                            | 6 |   |   |   | 4.0   | 120.0  | 36.0   |       |       |       | 84.0   |      |      |      |      |      |      |      |      |      |      |      | 3    | 4    |      |     |    | 777 |     |
| OKBN6                              | OK BB FN 6                                                                                            | 7 |   |   |   | 4.0   | 120.0  | 48.0   |       |       |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      |      | 3    | 4    |     |    | 777 |     |
| OKBN7                              | OK BB FN 7                                                                                            | 7 |   |   |   | 4.0   | 120.0  | 48.0   |       |       |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      |      |      | 3    | 4   |    | 777 |     |
| 4.3                                | Educational components of the free choice of the university-wide catalog                              |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| OKBS1                              | OK BS 3/1 1                                                                                           | 5 |   |   |   | 4.0   | 120.0  | 48.0   | 16    | 32    |       | 72.0   |      |      |      |      |      |      |      |      | 3    | 4    |      |      |      |      |     |    | 777 |     |
| OKBS2                              | OK BS 3/1 2                                                                                           | 6 |   |   |   | 4.0   | 120.0  | 36.0   | 12    | 24    |       | 84.0   |      |      |      |      |      |      |      |      |      |      | 3    | 4    |      |      |     |    | 777 |     |
| OKBS3                              | OK BS 3/1 3                                                                                           | 7 |   |   |   | 4.0   | 120.0  | 48.0   | 16    | 32    |       | 72.0   |      |      |      |      |      |      |      |      |      |      |      |      | 3    | 4    |     |    | 777 |     |
| 4.4                                | Educational components of special university choice                                                   |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |     |    |     |     |
| OKCBY                              | OKCBY                                                                                                 | 3 |   |   |   | 3.0   | 90.0   | 64.0   |       |       |       | 26.0   |      |      |      |      |      | 4.0  | 3.0  |      |      |      |      |      |      |      |     |    | 777 |     |
| Total for education period         |                                                                                                       |   |   |   |   | 248.0 | 7296.0 | 2824.0 | 892.0 | 924.0 | 632.0 | 4378.0 | 24.0 | 36.0 | 25.0 | 30.0 | 24.0 | 30.0 | 23.0 | 30.0 | 21.0 | 30.0 | 24.0 | 30.0 | 21.0 | 30.0 |     |    |     |     |
| Hours per week                     |                                                                                                       |   |   |   |   |       |        |        |       |       |       |        |      | 24.0 | 25.0 | 25.0 | 30.0 | 24.0 | 30.0 | 23.0 | 30.0 | 21.0 | 30.0 | 24.0 | 30.0 | 21.0 |     |    |     |     |
| Number of exams                    |                                                                                                       |   |   |   |   |       |        |        |       |       |       |        |      | 4    | 3    | 4    | 4    | 4    | 4    | 2    | 3    | 3    | 4    |      |      |      |     |    |     |     |
| Number of tests                    |                                                                                                       |   |   |   |   |       |        |        |       |       |       |        |      | 4    | 4    | 4    | 3    | 4    | 4    | 5    | 3    | 4    |      |      |      |      |     |    |     |     |
| Number of course projects (works)  |                                                                                                       |   |   |   |   |       |        |        |       |       |       |        |      |      |      |      |      |      |      |      |      | 1    | 1    | 1    |      |      |     |    |     |     |
| Number of disciplines per semester |                                                                                                       |   |   |   |   |       |        |        |       |       |       |        | 8    | 7    | 8    | 8    | 7    | 8    | 8    | 7    | 8    | 8    | 8    |      |      |      |     |    |     |     |

| Individual tasks |                             |
|------------------|-----------------------------|
| IP               | Calculator task             |
| PI               | Calculator and graphic task |
| PE               | Report                      |
| PII              | Course project              |
| IP               | Course work                 |

Approved by the Academic Council of NTU "KhPI"  
Protocol No. from 18 April 2025

Vice-rector for scientific and pedagogical work

Gennadiy KHRYPUNOV

Guarantor of the academic program  
"Cybersecurity"

Serhiy YEVSEIEV

Director of the Institute of Computer Science  
and Information Technology

Mykhailo GOOLEVSKYI

Head of the Cybersecurity Department

Serhiy YEVSEIEV

Practices and certifications are conducted by graduating departments

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List 1 - Educational components of the free choice of a student of specialised training

| EPP code | Name of academic discipline                                                         | Distribution by semesters |              |                  | Number of ECTS credits | Number of hours |           |            |           |                 |                              | Distribution of classroom hours per week and ECTS credits by semesters |              |                   |              |                   |              |                   |                   |                   |                   |                   |                   |                   |                   |              |                   | Department |              |                   |              |  |  |  |  |  |  |  |  |
|----------|-------------------------------------------------------------------------------------|---------------------------|--------------|------------------|------------------------|-----------------|-----------|------------|-----------|-----------------|------------------------------|------------------------------------------------------------------------|--------------|-------------------|--------------|-------------------|--------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------|-------------------|------------|--------------|-------------------|--------------|--|--|--|--|--|--|--|--|
|          |                                                                                     | Exams                     | Credit tests | Individual tasks |                        | Total           | Classroom |            |           | Individual work | I year                       |                                                                        |              |                   | II year      |                   |              |                   | III year          |                   |                   |                   | IV year           |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
|          |                                                                                     |                           |              |                  |                        |                 | including |            |           |                 | Semesters                    |                                                                        |              |                   |              |                   |              |                   |                   |                   |                   |                   |                   |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
|          |                                                                                     |                           |              |                  |                        |                 | lectures  | laboratory | practical |                 | 1                            | 2                                                                      | 3            | 4                 | 5            | 6                 | 7            | 8                 | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits | Classroom m hours |            | ECTS credits | Classroom m hours | ECTS credits |  |  |  |  |  |  |  |  |
|          |                                                                                     |                           |              |                  |                        |                 |           |            |           |                 | Number of weeks per semester |                                                                        |              |                   |              |                   |              |                   |                   |                   |                   |                   |                   |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
|          |                                                                                     |                           |              |                  |                        |                 |           |            |           |                 | 16                           | 16                                                                     | 16           | 16                | 16           | 12                | 16           | 12                |                   |                   |                   |                   |                   |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
|          |                                                                                     |                           |              |                  |                        |                 |           |            |           |                 | 16                           | 16                                                                     | 16           | 16                | 16           | 12                | 16           | 12                |                   |                   |                   |                   |                   |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| 1        | 2                                                                                   | 3                         | 4            | 5                | 6                      | 7               | 8         | 9          | 10        | 11              | 12                           | Classroom m hours                                                      | ECTS credits | Classroom m hours | ECTS credits | Classroom m hours | ECTS credits | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits      | Classroom m hours | ECTS credits      | 29           |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| 4.2      | Освітні компоненти вільного вибору студента профільної підготовки                   |                           |              |                  |                        |                 |           |            |           |                 |                              |                                                                        |              |                   |              |                   |              |                   |                   |                   |                   |                   |                   |                   |                   |              |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 1    | Legal regulation of information security                                            |                           | 3            |                  | 4,0                    | 120,0           | 48,0      | 32,0       |           | 16,0            | 72,0                         |                                                                        |              |                   | 3,0          | 4,0               |              |                   |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 2    | Intellectual property of security systems                                           |                           | 3            |                  | 4,0                    | 120,0           | 48,0      | 32,0       |           | 16,0            | 72,0                         |                                                                        |              |                   | 3,0          | 4,0               |              |                   |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 3    | Design templates                                                                    |                           | 3            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   | 3,0          | 4,0               |              |                   |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 4    | Methods and technologies of information warfare                                     |                           | 4            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   | 3,0          | 4,0               |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 5    | Protecting e-commerce and multiservice systems                                      |                           | 4            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   | 3,0          | 4,0               |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 6    | Databases with SQL and Python                                                       |                           | 4            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              | 3,0               | 4,0          |                   |                   |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 7    | Security at DEVOPS                                                                  |                           | 5            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              | 3,0               | 4,0               |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 8    | Fundamentals of planning and administration of information resource access services |                           | 5            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              | 3,0               | 4,0               |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 9    | Risk theory in cybersecurity                                                        |                           | 5            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              | 3,0               | 4,0               |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 10   | Cryptanalysis methods                                                               |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              | 3,0               | 4,0               |                   |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 11   | Internet science. Navigation in complex systems                                     |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              |                   | 3,0               | 4,0               |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 12   | Development of server applications (Java Spring Boot)                               |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              |                   | 3,0               | 4,0               |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 13   | Neural networks                                                                     |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              |                   | 3,0               | 4,0               |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 14   | Cloud security                                                                      |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              |                   | 3,0               | 4,0               |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 15   | Testing mobile applications                                                         |                           | 6            |                  | 4,0                    | 120,0           | 36,0      | 24,0       | 12,0      |                 | 84,0                         |                                                                        |              |                   |              |                   |              |                   | 3,0               | 4,0               |                   |                   |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 16   | Administering UNIX-like systems                                                     |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 17   | Organisational support for information security                                     |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 18   | IT project management and security                                                  |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 19   | Security and audit of wireless and mobile networks                                  |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 20   | Business intelligence                                                               |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |
| ВДП 21   | Evolutionary programming                                                            |                           | 7            |                  | 4,0                    | 120,0           | 48,0      | 32,0       | 16,0      |                 | 72,0                         |                                                                        |              |                   |              |                   |              |                   |                   |                   | 3,0               | 4,0               |                   |                   |                   | 328          |                   |            |              |                   |              |  |  |  |  |  |  |  |  |