

**THE FEDERAL STATE AUTONOMOUS EDUCATIONAL INSTITUTION OF HIGHER
EDUCATION
«SAINT-PETERSBURG NATIONAL RESEARCH UNIVERSITY
OF INFORMATION TECHNOLOGIES, MECHANICS AND OPTICS»**

Faculty of secure information technologies

COURSEWORK (PROJECT)

on course:

«Information Security Risk Management»

topic of the coursework:

«Information Security risk assessment, implementation and control»

Written by:

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Completed with the grade: _____
(one from above: Excellent, Good, Satisfactory, Unsatisfactory)

St. Petersburg, **2025**

**SAINT-PETERSBURG NATIONAL RESEARCH UNIVERSITY
OF INFORMATION TECHNOLOGIES, MECHANICS AND OPTICS**

OBJECTIVES FOR A COURSEWORK (PROJECT)

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Program/Major Information Security

Supervisor Livshitz Ilya, ITMO University, PhD
(Full name, place of employment, position, academic title, degree)

Course name Information Security Risk Management

Topic of the coursework Information Security risk assessment,
implementation and control

Task Controls select of risk identification and assessment methods
and their implementation

Guidelines for coursework Lecture material for
Information Security Risk Management course

Content of the coursework (list of key issues) Assets identification and
assessment, Vulnerabilities identification and assessment, Threats identification and assessment,
Risks and residual risks identification and assessment

Source materials and publications ISO 27001, ISO 27005, ISO 13335, ISO 31000, ISO 22301

Supervisor Livshitz Ilya
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Student Louise Namugayi
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**SAINT-PETERSBURG NATIONAL RESEARCH UNIVERSITY
OF INFORMATION TECHNOLOGIES, MECHANICS AND OPTICS**

SCHEDULE FOR A COURSEWORK (PROJECT)

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Course name Information Security Risk Management

Topic of the coursework Information Security risk assessment, implementation and control

SCHEDULE

Stage #	Stage title	Completion date		Grade and supervisor signature (five-point scale)
		Planned	Actual	
1	Assets identification and assessment	19/02/2025	20/03/2025	
2	Vulnerabilities identification and assessment	27/02/2025	24/03/2025	
3	Threats identification and assessment	6/03/2025	27/03/2025	
4	Risks and residual risks identification and assessment	13/03/2025	02/04/2025	

Supervisor Livshitz Ilya
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Student Louise Namugayi
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**SAINT-PETERSBURG NATIONAL RESEARCH UNIVERSITY
OF INFORMATION TECHNOLOGIES, MECHANICS AND OPTICS**

ABSTRACT FOR A COURSEWORK (PROJECT)

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Course name Information Security Risk Management

Topic of the coursework Information Security risk assessment, implementation and control

CHARACTERISTICS OF A COURSEWORK (PROJECT)

- 1. Purpose and tasks** ☒ Offered by student ☒ Formulated with the participation of the student
☐ Determined by supervisor
- 2. Character of work** ☒ Calculation ☐ Design
☐ Simulation ☐ Other, _____

4. Content of the coursework

Assets identification and assessment, Vulnerabilities
identification and assessment, Threats identification and assessment, Risks and residual risks
identification and assessment

5. Summary of results/conclusions

The identification and risk assessment was carried out. Recommendations were made for top
Management for the protection of IT security.

Supervisor Livshitz Ilya signature

Student Louise Namugayi signature

«_2_» __April__ 2025 г.

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INTRODUCTION

The goal of coursework: Controls select of risk identification and assessment methods and their implementation.

The tasks of course work:

- Identify and assess assets;
- Identify and assess vulnerabilities;
- Identify and assess assets threats;
- Identify and assess assets risks and residual risks;
- Make recommendations for top management for the protection of IT security.

Let's assume Crystal Bank Company.

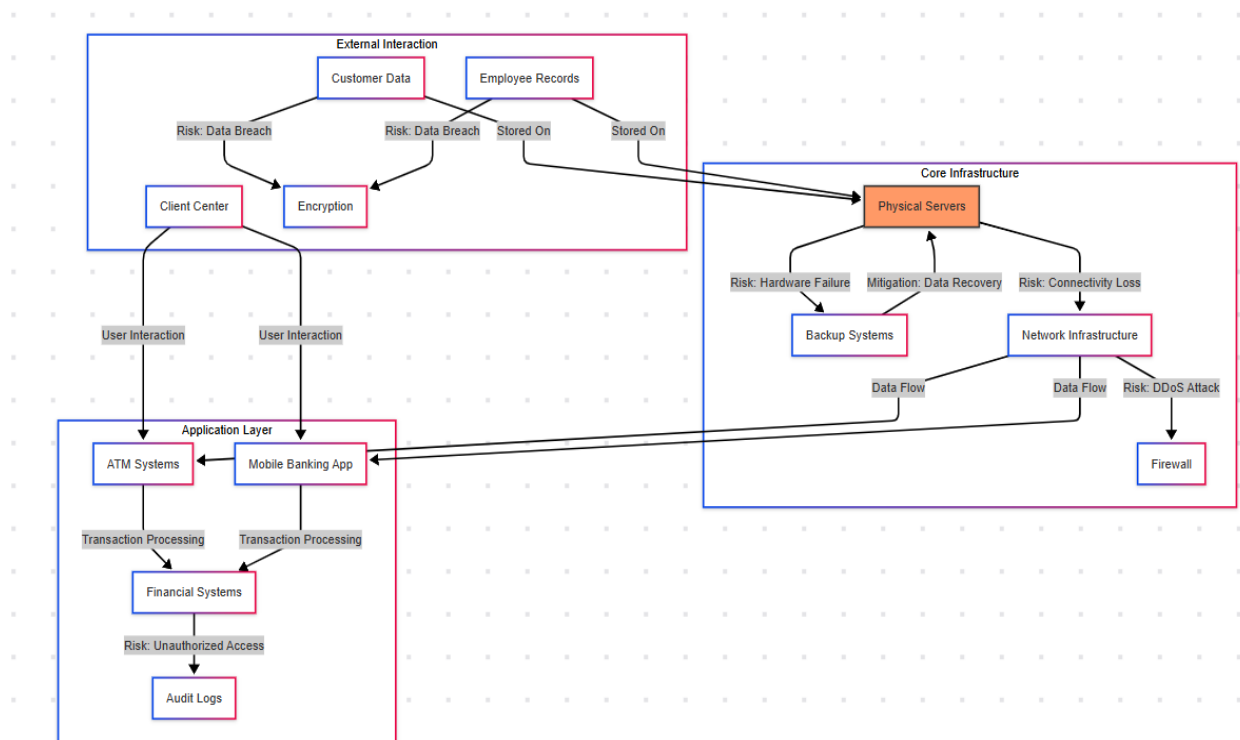


Figure 1. – Company's assets scope

1. Assets identification and assessment

1.1. Goals

Define list of assets for Crystal Bank and perform both identification and assessment procedures for ones.

1.2. Tasks

- Select all applicable types of the assets for Crystal Bank
- Perform identification of assets in accordance with ISO 27001 (ISO 31000)
- Create list of recommendations for top management about IT security protection for assets

1.3. Input data

Describe a list of important assets in accordance with scope and boundaries of «Crystal Bank». The result shown in Table 1.1

Table 1.1 – Initial assets identification

№	Asset name	Asset location	Asset characteristics	Asset technics	Asset scope	Asset boundaries
1.	Customer Data	Data Center	Sensitive customer information	Encryption, Access Control	Data Privacy	Internal and External
2.	Employee Records	HR Department	Personal and Payroll information	Access Control, Encryption	HR Management	Internal
3.	Physical Servers	Server Room	Hardware Infrastructure	Environmental Controls	IT Infrastructure	Physical Security
4.	Financial Systems	Data Center	Core Banking software	Firewalls, Intrusion Detection	Financial operations	Internal Network
5.	Network Infrastructure	Data Center	Router, Switches, Cables	Network, Monitoring Redundancy	IT Operations	Internal and External
6.	ATM Systems	Branch locations	Transaction Processing	Encryption, Physical Security	Financial operations	External
7.	Mobile Banking App	Cloud	Customer transactions	Encryption, Access Control	Data Privacy	External
8.	Backup systems	Data Center	Data replication	Encryption, Redundancy	IT Operations	Internal

1.4. Outcomes

Define a type and owner for each identified asset.

The result shown in Table 1.2

Table 1.2 – List of assets identification by type and owner

№	Asset name	Asset type	Asset owner
1.	Customer data	Intangible	Chief Data Officer
2.	Employee Records	Intangible	Head of HR Department
3.	Physical Servers	Tangible	IT Infrastructure Manager
4.	Financial Systems	Digital	Chief Information Officer (CIO)

№	Asset name	Asset type	Asset owner
5.	<i>Network Infrastructure</i>	<i>Physical</i>	<i>Head of Networks Department</i>
6.	<i>ATM Systems</i>	<i>Physical</i>	<i>Branch Manager</i>
7.	<i>Mobile Banking App</i>	<i>Digital</i>	<i>Chief Technology Officer</i>
8.	<i>Backup Systems</i>	<i>Digital</i>	<i>IT Operations Manager</i>

Define asset' size and asset's cost for each identified assets under asset' owner mark.

There are two methods for asset's part cost evaluation – Qualitative (High, Medium,...) and Quantitate (point, euros,...)

The result shown in **Table 1.3**

Table 1.3 – List of assets identification by size, cost after Owner established

№	Asset name	Asset size	Asset (tangible part) cost	Asset (intangible part) level	Asset marks
1.	<i>Customer data</i>	<i>Big</i>	<i>Intangible value</i>	<i>Very High</i>	<i>10</i>
2.	<i>Employee Records</i>	<i>Medium</i>	<i>Intangible value</i>	<i>High</i>	<i>8</i>
3.	<i>Physical servers</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>	<i>7</i>
4.	<i>Financial systems</i>	<i>Big</i>	<i>High</i>	<i>Very High</i>	<i>9</i>
5.	<i>Network Infrastructure</i>	<i>Big</i>	<i>High</i>	<i>High</i>	<i>9</i>
6.	<i>ATM Systems</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>	<i>7</i>
7.	<i>Mobile Banking App</i>	<i>Big</i>	<i>High</i>	<i>Very High</i>	<i>10</i>
8.	<i>Backup systems</i>	<i>Medium</i>	<i>Medium</i>	<i>Medium</i>	<i>6</i>

1.5. Conclusion

The company «Crystal Bank» assets has been defined.







Assets evaluation has been completed against Owner's criteria and installed IT-security controls.

The final list of recommendations for top management about IT-security protection for all identified assets of «Crystal Bank» company has been prepared.

For example, the initial list of assets was cut in half after the analysis in the first stage.

The result shown in **Table 1.4**

Table 1.4 – Decision's list after Criteria evaluation

№	Asset name	Asset marks	Criteria marks	Decision (Applicable)	List of controls	Responsible
1.	<i>Customer Data</i>	<i>10</i>	<i>7</i>		<i>A.8.1.2, A.8.2.1 A.9.4.1</i>	<i>Chief Data Officer (CDO)</i>
2.	<i>Employee Records</i>	<i>8</i>	<i>7</i>		<i>A.8.2.1 A.9.2.3 A.10.1.1</i>	<i>Head of HR Department</i>
3.	<i>Financial Systems</i>	<i>9</i>	<i>7</i>		<i>A.12.6.1 A.13.1.1 A.14.1.2</i>	<i>Chief Information Officer (CIO)</i>
4.	<i>Network Infrastructure</i>	<i>9</i>	<i>7</i>		<i>A.13.1.1 A.17.1.2 A.12.6.1</i>	<i>Head of Networks Department</i>
5.	<i>Mobile Banking App</i>	<i>10</i>	<i>7</i>		<i>A.14.1.2 A.18.1.4 A.12.4.1</i>	<i>Chief Technology Officer (CTO)</i>
6.	<i>ATM Systems</i>	<i>7</i>	<i>7</i>		<i>A.9.1.1 A.14.1.1</i>	<i>Branch Manager</i>

№	Asset name	Asset marks	Criteria marks	Decision (Applicable)	List of controls	Responsible
7.	<i>Backup systems</i>	6	7	Yes	A.12.3.1 A.17.1.3	IT Operations Manager
8.	<i>Physical Servers</i>	7	7	Yes	A.11.1.1 A.11.2.1	IT Infrastructure Manager

2. Vulnerabilities identification and assessment

2.1. Goals

Define list of vulnerabilities for «Crystal Bank» assets and perform an assessment procedure for ones.

2.2. Tasks

- Select all applicable types of the vulnerabilities for assets of «Crystal Bank»
- Perform assessment of vulnerabilities in accordance with ISO 27005
- Create list of recommendations for top management about IT-security protection for vulnerabilities

2.3. Input data

See Table 1.4

2.4. Outcomes

Define vulnerabilities and their type for identified assets

Table 2.1 – List of vulnerabilities and their types

№	Asset name	Vulnerability	Vulnerability type
1.	<i>Customer Data</i>	<i>Lack of encryption</i>	<i>Technical</i>
2.	<i>Employee Records</i>	<i>Unauthorized access</i>	<i>Organizational</i>
3.	<i>Financial systems</i>	<i>Software vulnerabilities</i>	<i>Technical</i>
4.	<i>Network Infrastructure</i>	<i>Network outages</i>	<i>Technical</i>
5.	<i>Mobile Banking App</i>	<i>Weak authentication</i>	<i>Technical</i>

There are two methods for asset's vulnerabilities evaluation – Qualitative (High, Medium,) and Quantitate (point, ...). The assets vulnerabilities assessment are shown below in the scale:

- Very small – 0
- Small – 1 – 2
- Medium – 2 – 3
- High – 3 – 4
- Very High – 4 – 5

Table 2.2 – List of vulnerabilities assessment

№	Asset name	Vulnerability	Assessment method	Vulnerability mark	Auditor
1.	<i>Customer data</i>	<i>Lack of encryption</i>	<i>Penetration testing</i>	4	<i>Chief Data Officer</i>
2.	<i>Employee Records</i>	<i>Unauthorized access</i>	<i>Audit</i>	3	<i>Head of HR Department</i>
3.	<i>Financial Systems</i>	<i>Software vulnerabilities</i>	<i>Vulnerability scan</i>	4	<i>Chief Information Officer (CIO)</i>
4.	<i>Network Infrastructure</i>	<i>Network outages</i>	<i>Monitoring</i>	4	<i>Head of Networks Department</i>
5.	<i>Mobile Banking Application</i>	<i>Weak authentication</i>	<i>Penetration testing</i>	4	<i>Chief Technology Officer (CTO)</i>

2.5. Conclusion

Vulnerabilities of the assets of the company «Crystal Bank» were identified.

Vulnerabilities evaluation has been completed against Auditor's criteria for all assets.

The final list of recommendations for top management about IT-security protection for all vulnerabilities of all identified assets of «Crystal Bank» company has been prepared.

For example, the initial list of vulnerabilities of the assets was reduced from 5 to 3 after the analysis in the second stage, focusing on the most critical vulnerabilities.

The result shown in Table 2.3

Table 2.3 – recommendation list

№	Asset name	Vulnerability	Vuln. marks	Criteria marks	Decision (Applicable)	Auditor
1.	<i>Customer data</i>	<i>Lack of encryption</i>	4	3	No	<i>Chief Data Officer (CDO)</i>
2.	<i>Employee Records</i>	<i>Unauthorized access</i>	3	3	Yes	<i>Head of HR Department</i>
3.	<i>Financial Systems</i>	<i>Software vulnerabilities</i>	4	3	No	<i>Chief Information Officer</i>
4.	<i>Mobile Banking Application</i>	<i>Weak authentication</i>	4	3	No	<i>Chief Technology Officer (CTO)</i>
5.	<i>Network Infrastructure</i>	<i>Network outages</i>	4	3	No	<i>Head of Networks Department</i>

3. Threats identification and assessment

3.1. Goals

Define list of threats for «Crystal Bank» vulnerabilities of identified assets and perform an assessment procedure for ones.

3.2. Tasks

- Select all applicable types of the threats for defined vulnerabilities of «Crystal Bank»
- Perform assessment of threats in accordance with ISO 27005
- Create list of recommendations for top management about IT-security protection for threats

3.3. Input data

See Table 2.3

3.4. Outcomes

Define threats and their type and origin for vulnerabilities of identified assets.

Use Annexes C and D from ISO/IEC 27005.

The results are shown in Table 3.1

Table 3.1 – List of threats and threat type

№	Asset name	Vulnerability	Threat	Threat type	Threat origin
1.	Customer data	Lack of encryption	Data Breach	Compromise of information	External
2.	Financial systems	Software vulnerabilities	Cyber attack	Compromise of information	External
3.	Mobile Banking Application	Weak authentication	Account takeover	Unauthorized action	External
4.	Network Infrastructure	Network Outages	Service Disruption	Availability Loss	Internal

There are two methods for asset threat's evaluation – Qualitative (High, Medium,) and Quantitative (point, ...). The threat assessment is shown below in the scale:

- Very small – 0
- Small – 1
- Medium – 2
- High – 3
- Very High – 4

The results of threats assessment are shown in Table 3.2

Table 3.2 – List of threats assessment

№	Asset name	Threat	Threat type	Threat origin	Threat mark	Auditor
1.	Customer Data	Data Breach	Compromise of information	External	4	Chief Data Officer (CDO)
2.	Financial systems	Cyber attack	Compromise of information	External	4	Chief Information Officer (CIO)
3.	Mobile Banking Application	Account takeover	Unauthorized action	External	4	Chief Technology Officer (CTO)
4.	Network Infrastructure	Service Disruption	Availability Loss	Internal	3	Head of Networks Department

3.5. Conclusion

All threats of the assets of the company «Crystal Bank» were identified.

Threats evaluation has been completed against Auditor's criteria for all assets.

The final list of recommendations for top management about IT-security protection for all threats of all identified assets of «Crystal Bank» company has been prepared.

For example, the initial list of threats of the assets was cut in half after the analysis in the third stage.

The result shown in Table 3.3

Table 3.3 – recommendation list

№	Asset name	Threat	Threat marks	Criteria marks	Decision (Applicable)	Auditor
1.	<i>Customer Data</i>	<i>Data breach</i>	<i>4</i>	<i>3</i>	<i>No</i>	<i>Chief Data Officer (CDO)</i>
2.	<i>Financial Systems</i>	<i>Cyber attack</i>	<i>4</i>	<i>3</i>	<i>No</i>	<i>Chief Information Officer (CIO)</i>
3.	<i>Mobile Banking Application</i>	<i>Account Takeover</i>	<i>4</i>	<i>3</i>	<i>No</i>	<i>Chief Technology Officer (CTO)</i>
4.	<i>Network Infrastructure</i>	<i>Service Disruption</i>	<i>3</i>	<i>3</i>	<i>Yes</i>	<i>Head of Networks Department</i>

4. Risks identification and assessment

4.1 Goals

Perform sequential identification and risk assessment for the all defined and pre-assessed assets for «Crystal Bank» company.

4.2 Tasks

- Perform identification and assessment of risks in accordance with ISO 27005 for «Crystal Bank» assets.
- Create a list of recommendations for top management about IT-security risks treatment.

4.3 Input data

Table 4.1 – Initial assets identification

№	Asset name	Decision (Applicable) Table 1.4	Vulnerability	Decision (Applicable) Table 2.3	Threat	Decision (Applicable) Table 3.3
1.	<i>Customer Data</i>	<i>No</i>	<i>Lack of encryption</i>	<i>No</i>	<i>Data Breach</i>	<i>No</i>
2.	<i>Financial Systems</i>	<i>No</i>	<i>Software vulnerabilities</i>	<i>No</i>	<i>Cyber attack</i>	<i>No</i>
3.	<i>Mobile Banking App</i>	<i>No</i>	<i>Weak Authentication</i>	<i>No</i>	<i>Account Takeover</i>	<i>No</i>

4.4 Outcomes

There are two methods for risk's evaluation – Qualitative (High, Medium,) and Quantitate (point, ...). The risk assessment is shown below in the scale:

- Very small – 0
- Small – 1
- Medium – 2
- High – 3
- Very High – 4

Use Annex E from ISO/IEC 27005.

The results of risk assessment are shown in **Table 4.2**

Generally, **Risk mark = Likelihood * Business impact (Severity)**

Table 4.2 – Risk identification and assessment

№	Asset name	Threat	Likelihood of incident scenario	Business Impact	Risk level	Risk mark
1.	<i>Customer Data</i>	<i>Data breach</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>	<i>2</i>
2.	<i>Financial systems</i>	<i>Cyber attack</i>	<i>High</i>	<i>High</i>	<i>High</i>	<i>3</i>
3.	<i>Mobile Banking App</i>	<i>Account Takeover</i>	<i>High</i>	<i>Very High</i>	<i>Very High</i>	<i>4</i>

4.5 Conclusion

All risks of the assets of the company «Crystal Bank» were identified.

Risks evaluation has been completed against Auditor's criteria for all assets.

The final list of recommendations for top management about IT-security risk for all identified assets of «Crystal Bank» company has been prepared.

The result shown in Table 4.3

Table 4.3 – Recommendation list

№	Asset name	Threat	Risk level	Risk criteria	Decision (Applicable)	Decision (Treatment)	Auditor
1.	<i>Customer data</i>	<i>Data Breach</i>	<i>Medium</i>	<i>Medium</i>	<i>Yes</i>	<i>No</i>	<i>Chief Data Officer</i>
2.	<i>Financial systems</i>	<i>Cyber attack</i>	<i>High</i>	<i>Medium</i>	<i>No</i>	<i>Yes</i>	<i>Chief Information Officer</i>
3.	<i>Mobile Banking App</i>	<i>Account Takeover</i>	<i>Very High</i>	<i>Medium</i>	<i>No</i>	<i>Yes</i>	<i>Chief Technology Officer</i>

5. Controls select and implementation

5.1. Goals

Select appropriate security measures for risk management

5.2. Tasks

- Select the appropriate protection measures for risk treatment in accordance with ISO 27001 and ISO 22301
- Suggest appropriate measures to monitor the selected protection measures in accordance with ISO 31000 (27001) and ISO 22301
- Create a list of recommendations for top management about risks control

5.3. Input data

See [Table 4.3](#)

5.4. Outcomes

Use Annex A from ISO/IEC 27001.

The results of selection of new IT-security control are shown in [Table 5.1](#)

Table 5.1 – Risk treatment and required resources

№	Asset name	Threat	Decision (Treatment)	Type of Risk treatment	Required resources	IT-security control (New)
1.	<i>Financial systems</i>	<i>Cyber attack</i>	<i>Yes</i>	<i>Changing the likelihood with update software patches and intrusion detection</i>	<i>Vulnerability scanning tools. Patch management tools</i>	<i>A.12.6.1 A.13.1.1 A.14.1.2 A.5.7 A.8.16 A.16.1.1</i>
2.	<i>Mobile banking application</i>	<i>Account takeover</i>	<i>Yes</i>	<i>Implement multifactor authentication and session controls</i>	<i>Identity Access Management solutions, Authentication protocols</i>	<i>A.9.2.3 A.9.4.1 A.14.1.2 A.9.4.2 A.9.4.4 A.9.4.5</i>

5.5. Conclusion

The new IT-security controls for assets of the company «[Crystal Bank](#)» were selected.

The types of risk treatment were defined.

The final list of recommendations for top management about treatment the IT-security risk for all identified assets of «[Crystal Bank](#)» company has been prepared.

The result shown in [Table 5.2](#)

Table 5.2 – Recommendation list

№	Asset name	Threat	Decision (Treatment)	IT-security control (New)	Auditor
1.	<i>Financial Systems</i>	<i>Cyber attacks</i>	<i>Yes</i>	<i>A.12.6.1 A.13.1.1 A.14.1.2 A.5.7 A.8.16 A.16.1.1</i>	<i>Chief Information Officer</i>

№	Asset name	Threat	Decision (Treatment)	IT-security control (New)	Auditor
2.	<i>Mobile Banking Application</i>	<i>Account Takeover</i>	<i>Yes</i>	<i>A.9.2.3 A.9.4.1 A.14.1.2 A.9.4.2 A.9.4.4 A.9.4.5</i>	<i>Chief Technology Officer (CTO)</i>

6. Residual risks identification and re-assessment

6.1 Goals

Perform a re-assessment of the risks and residual risks for all identified and pre-assessed assets of the company «Crystal Bank», considering the selected additional protection measures

6.2 Tasks

- Perform re-assessment of IT-security risks in accordance with ISO 27005 for «Crystal Bank» assets.
- Perform analyses of IT-security residual risk and evaluate ones against criteria again.
- Create a list of recommendations for top management about IT-security risks treatment.

6.3 Input data

See Table 4.3

See Table 5.2

6.4 Outcomes

There are two methods for residual risk's evaluation – Qualitative (High, Medium,) and Quantitate (point, ...). The risk re-assessment are shown below in the scale:

- Very small – 0
- Small – 1
- Medium – 2
- High – 3
- Very High – 4

Use Annex E from ISO/IEC 27005.

The results of residual risk assessment are shown in Table 6.1

Generally, Residual Risk mark = Likelihood * Business impact (Severity)

Table 6.1 – Results of residual risk assessment

№	Asset name	Threat	IT-security control (New)	Likelihood of incident scenario	Business Impact	Residual risk level	Auditor
1.	<i>Financial Systems</i>	<i>Cyber attack</i>	<i>A.12.6.1 A.13.1.1 A.14.1.2 A.5.7 A.8.16 A.16.1.1</i>	<i>Medium</i>	<i>High</i>	<i>Medium</i>	<i>Chief Information Officer</i>
2.	<i>Mobile Banking App</i>	<i>Account Takeover</i>	<i>A.9.2.3 A.9.4.1 A.14.1.2 A.9.4.2 A.9.4.4</i>	<i>Medium</i>	<i>Very High</i>	<i>High</i>	<i>Chief Technology Officer</i>

№	Asset name	Threat	IT-security control (New)	Likelihood of incident scenario	Business Impact	Residual risk level	Auditor
			<i>A.9.4.5</i>				

6.5 Conclusion

All residual risks of the assets of the company «Crystal Bank» were identified and re-assessed.

Residual risks evaluation has been completed against Auditor's criteria for all assets.

The final list of recommendations for top management about IT-security residual risk for all identified assets of «Crystal Bank» company has been prepared.

The result shown in Table 6.2

Table 6.2 – Recommendation list

№	Asset name	Threat	Risk level	Risk criteria	Residual risk level	Decision (Final)	Auditor
1.	<i>Financial Systems</i>	<i>Cyber attack</i>	<i>High</i>	<i>High</i>	<i>Medium</i>	<i>Mitigate further</i>	<i>Chief Information Officer</i>
2.	<i>Mobile Banking Application</i>	<i>Account Takeover</i>	<i>Very High</i>	<i>Very High</i>	<i>High</i>	<i>Mitigate immediately</i>	<i>Chief Technology Officer (CTO)</i>

6.6 Final CONCLUSION

The goal of coursework – Controls select of risk identification and assessment methods and their implementation – was achieved through the following tasks:

- Identify and assess assets;
- Identify and assess vulnerabilities;
- Identify and assess assets threats;
- Identify and assess assets risks and residual risks;
- Make recommendations for top management for the protection of IT-security.

7. BIBLIOGRAPHY

- ISO/IEC 13335-1-2004
- ISO/IEC 27005
- ISO/IEC 27001
- ISO/IEC 22301
- ISO/IEC 31000