Borys Grinchenko Kyiv Metropolitan University
Faculty of Law and International Relations
Department of Public and Private Law
Pedagogical Institute
Department of Theory and History of Pedagogy
Faculty of Information Technology and Mathematics
Department of Computer Science

APPROVED
Vice-Rector for Research
_____ Natalia VINNIKOVA
«__» _____ 2024

Syllabus

Content Module
«ICT in Contemporary Scientific Research»

SYLLABUS

for PhD students

Specialties: 033 Philosophy

Educational Level: Third (Educational and Scientific / PhD level)

Educational and Scientific Programmes: «Philosophy»

Kyiv – 2024

Developer:

Nataliia V. Morze, Doctor of Pedagogical Sciences, Professor, Professor of the Department of Computer Science, Faculty of Information Technology and Mathematics, Borys Grinchenko Kyiv Metropolitan University.

Lecturer:

Nataliia V. Morze, Doctor of Pedagogical Sciences, Professor, Professor of the Department of Computer Science, Faculty of Information Technology and Mathematics, Borys Grinchenko Kyiv Metropolitan University.

The Course Syllabus was reviewed and approved at the meeting of the Department of Computer Science.

Protocol No. 8 dated 04.09.24

Head of the Department _____ Iryna MASHKINA

The Course Syllabus has been verified.

«04» 09 2024

Head of Postgraduate and Doctoral Studies _____ Ilona TRYHUB

Extended:

For the academic year **20__/20__** _____ (_____), "_" _____ **20** , Protocol No. ___

For the academic year **20__/20__** _____ (_____), "_" _____ **20** , Protocol No. ___

For the academic year **20__/20__** _____ (_____), "_" _____ **20** , Protocol No. ___

For the academic year **20__/20__** _____ (_____), "_" _____ **20** , Protocol No. ___

1. Description of the Course Content Module

Indicator Name	Course Characteristics by Form of Study	
	Full-time	Part-time
SCIENTIFIC RESEARCH STRATEGIES		
Type of course	Mandatory	
Language of instruction, learning, and assessment	Ukrainian / English	
Total ECTS credits / hours	6 / 180, including: Content module "ICT in Modern Scientific Research" 2/60	
Year of study	1, 2	1, 2
Semester	1, 2, 3	1, 2, 3
Number of content modules with distribution:	5	5
Total credits	6	6
Total hours, including:	180	180
Classroom hours	48	24
Modular control	12	-
Self-study	120	156
Form of semester control	Credit	Credit
Content module "ICT in Modern Scientific Research"		
Year of study	2	2
Semester	3	3
Number of content modules with distribution:	1	1
Total credits	2	2
Total hours, including:	60	60
Classroom hours	16	8
Modular control	4	-
Self-study	40	52
Form of semester control	Credit	Credit

2. Goal and Objectives of the Content Module "ICT in Modern Scientific Research" within the Course "Scientific Research Strategies"

Goal: to develop the ability to utilize information technologies and software products in contemporary scientific research through the practical mastery of core computer software components; to familiarize PhD students with key technologies for implementing ICT in research processes, ranging from problem statement and the construction of relevant information models to the interpretation of computer-aided results.

Objectives:

- To internalize the potential and necessity of using information and communication technologies in scientific research;
- To acquire practical skills in utilizing digital information technologies at all stages of organizing and conducting scientific research;
- To master the methodology of ICT application in research activities;
- To develop the ability to independently locate and retrieve necessary information;
- To employ modern technologies in scientific research, orienting researchers toward the implementation of collaborative telecommunication projects,

teleconferences, webinars, web quests, distance learning, and research within scientometric databases.

As a result of studying the content module "ICT in Modern Scientific Research" within the course "Scientific Research Strategies," and in accordance with the Educational-Scientific Programme of the specialty, the following general and professional competencies are developed:

3. Learning Outcomes of the Course

Upon completion of the content module "**ICT in Modern Scientific Research**" within the course "Scientific Research Strategies," PhD students shall acquire the following competencies: the ability to analyze information from diverse sources and utilize library funds (both traditional and electronic); proficiency in information and communication technologies and the methodological foundations of their application; the ability to apply modern electronic information resources and specialized software in scientific and educational activities; the capacity to implement modern ICT for solving educational and scientific problems, as well as for modeling, monitoring, and processing experimental results.

Skills: to effectively utilize general-purpose application software; to employ specialized software developments in educational, scientific, and managerial activities; to analyze the feasibility and appropriateness of using specific information technologies in scientific research; to conduct searches for scientific data and field-specific information; to edit, adjust, and - given appropriate software and prior training - create software products for research purposes.

Programme Learning Outcomes:

- ability to locate and analyze information from various sources; perform communication tasks via social networks; and apply techniques for creating, storing, accumulating, and interpreting data using modern information and communication technologies. Proficiency in working with scientific information from specialized literary sources and the Internet.
- ability to apply ICT for solving educational and scientific tasks; development of scientific and methodological support for the effective application of ICT in educational, scientific, and managerial activities.

In accordance with the Educational-Scientific Programme of the Third (Educational-Scientific) Level, the study of this course facilitates the formation of general and special (subject-specific) competencies and the achievement of defined learning outcomes. The Matrix of Correspondence between programme competencies and learning outcomes for this educational component is provided at the end of the syllabus.

4. Structure of the Content Module

Course Schedule for Full-time Students

Title of content modules and topics		Distribution of hours by activity type		
		Classroom Hours		Self-study
		Lectures	Seminars	
CONTENT MODULE: ICT IN MODERN SCIENTIFIC RESEARCH				
Topic 1. Digital transformation of society, economy, science, and education.	8	2	-	6
Topic 2. ICT and research data management.	10	2	-	8
Topic 3. Digitalization of scientific research stages.	18	2	2	14
Topic 4. Open Science. Scientific communication and collaboration based on digital technologies.	10	2	2	6
Topic 5. Computer modeling in scientific research. Processing and analysis of research data.	10	2	2	6
Modular control	4			
Total	**60**	**10**	**6**	**40**

Course Schedule for Part-time Students

Title of content modules and topics	Total	Distribution of hours by activity type		
		Classroom Hours		Self-study
		Lectures	Seminars	
CONTENT MODULE: ICT IN MODERN SCIENTIFIC RESEARCH				
Topic 1. Digital transformation of society, economy, science, and education.	8	2		6
Topic 2. ICT and research data management.	10			10
Topic 3. Digitalization of scientific research stages.			2	16
Topic 4. Open Science. Scientific communication and collaboration based on digital technologies.	10		2	8
Topic 5. Computer modeling in scientific research. Processing and analysis of research data.	14		2	12
Total	**60**	**2**	**6**	**52**

5. Programme of the Content Module "ICT in Modern Scientific Research"

Topic 1. Digital Transformation of Society, Economy, Science, and Education

The concept of digital transformation. Tech trends. Digital transformation of society. Digital transformation in economy, science, and education. Educational trends.

Digital competence of citizens. Digital competence of educators. European digital competence frameworks: DigComp, Digital Competence Framework for Educators (DigCompEdu), UNESCO's ICT Competency Framework for Teachers, ISTE Standards for Educators (USA). EC Digital Education Action Plan (2021-2027). Digital researcher profile.

Media literacy and digital security. Critical evaluation of e-resources and data. Digital learning. Electronic resources for professional development of researchers.

Key concepts: digital transformation, tech trends, educational trends, digital competence, digital competence framework, digital researcher profile, digital security, media literacy, digital learning.

Topic 2. ICT and Research Data Management

The concept of research data. The significance of effective data management for research project success and modern digital technologies. Research Data Management (RDM) and storage cycle. Global and European requirements for data management and dissemination.

Data types and formats. Common formats for data storage. Discipline-specific data recording methods.

Data documentation and organization. File and folder naming conventions, logical data organization. Standard operations for data management and documentation during the research process. The concept of metadata. Standards for metadata collection and processing in various disciplines.

Data storage and security. Methods and best practices for data storage, backup, and protection.

Data dissemination, sharing, and reuse. Open Data. Archiving and long-term data preservation. Data standards and formats used for archiving. Types and capabilities of repositories for long-term data preservation.

Data retrieval. Fundamentals of searching for various data types on the Internet.

Key concepts: research data, data storage, data dissemination, data types, data formats, data organization, documentation, metadata, data protection, repositories, data search.

Topic 3. Digitalization of Scientific Research Stages

Stages of scientific research and modern digital tools.

ICT at the research preparation stage: defining research priorities, organizing scientific projects, research activity planning, research management: Trello, MeisterTask, Asana, Any.do, Todoist, TickTick.

ICT at the discovery stage: searching for sources, data, and software; gaining access, alerts, and recommendations; reading and peer-reviewing; annotation analysis: Web of Science, ResearchGate, Scopus, Mendeley, WorldCat, OpenAccess; compiling bibliographic descriptions in reference lists: EndNote, Biblioexpress, vak.in.ua, Zotero, Mendeley.

ICT at the analysis stage: tools for data collection, analysis, selection, and classification: Google Sheets, SPSS, MatLab, R, MS Excel, IPython, ROpenSci, DHbox; research protocols: Open Science Framework, myExperiment, BenchLing, Protocols.io, Benchfly, Scientific Protocol; tools for notes and research processes; secure ICT use and data protection: antivirus software (Avast, Avira, AVG), cloud storage (Dropbox, Google Drive), archivers (WinRAR).

ICT at the writing stage: typing, programming, visualization, citation, translation. Writing tools: Word, Google Docs, LaTeX, Authorea, Scrivener, Overleaf, Scalar. Visualization tools: Network Workbench Tool, Vantage Point, XLSTAT, Vosviewer, Pajek, Sci2 Tool, CiteSpace.

Citation tools: EndNote, Zotero, RefWorks, Mendeley, Papers, RefME, Citavi. Translation tools: DeepL Translator, Google Translate, Microsoft Translator, Worldlingo, Systran.

Quality assurance and review tools: Xbench, QA Distiller, Verifika, ErrorSpy, Linguistic Toolbox.

ICT at the publication stage: archiving, dissemination, journal selection, publication: arXiv, PubMed, ResearchGate, SSRN, Institutional Repositories; JCR, DOAJ, Scopus, Sherpa Romeo, QOAM, SCImago Journal Rank.

Web conferencing systems: OpenMeetings, BigBlueButton, Adobe Connect, Zoom, Microsoft Teams, Skype, Google Meet.

ICT and statistical data processing: SPSS, STATISTICA, STATA, R.

ICT at the dissemination and communication stage: archiving and distributing posters and presentations: Google Slides, Apple Keynote, Prezi, Speaker Deck, SlideShare, F1000Research, ScienceOpen, Figshare, Zenodo, Vimeo; representation beyond the academic community: Wikipedia, Research Blogging, WordPress, Kudos, FameLab, Pint of Science, Twitter (X); academic profiles: Institutional Repositories, Academia.edu, ORCID, ResearchGate, Google Scholar; researcher networks: EPALE, Scientific Social Community, BASE (Bielefeld Academic Search Engine) .

ICT at the evaluation stage: commenting, expert review (peer review), determining research impact, and researcher metrics: JCR (Impact Factor), Altmetric, Scopus, ImpactStory/PLoS Article, Web of Science, Harzing.

Key concepts: research stages, digital tools for research stages: preparation, discovery, analysis, writing, publication, dissemination and communication, evaluation.

Practical Class No. 1. Analysis of Trends in Scientific Research Tools over the Last 3 Years (Top 200 Tools for Education).

1. To analyze the methodology used to form the Top 200 Tools for Education ranking.

2. To investigate tool rankings for the last 3 years (compile a comparative table of the 20 most popular tools based on the core stages of scientific research).
3. To justify the positions of the top 3 most popular tools for each research stage.
4. To create an online document presenting the results of the analysis.

Topic 4. Open Science. Scientific Communication and Collaboration Based on Digital Technologies

The concept of Open Science. Five main pillars of Open Science: Open Access, Open Data, Open Methodology, Open Education, and Open Peer Review. Characteristics of Open Science formation; key provisions as defined in international documents. Principles of Open Science and their implementation in various pedagogical and scientific-educational systems: openness of methodology and data collection/presentation methods during research; open access to results with reuse possibilities; openness of scientific communication processes, etc. European Open Science Cloud (EOSC).

Scientific communication and collaboration based on digital technologies. Classification of scientific communication: formal and informal. Scientific communication systems. Electronic scientific journal systems. Digital platforms for scientific conferences. Global information space and scientific communication.

Key concepts: Open Science, Open Access, Open Data, Open Methods, Open Education, Open Peer Review, principles of Open Science, European Open Science Cloud, scientific communication and collaboration.

Practical Class No. 2. Creating a Researcher Portfolio. Communication and Collaboration via Computer Networks

1. To register profiles on ResearchGate, Google Scholar, ORCID, and LinkedIn.
2. To add publications to scientific profiles.
2. To add co-authors and colleagues to the networks.
3. To post research-related questions on ResearchGate.
4. To identify experts in the relevant research field on ResearchGate.
5. To conduct a literature search on ResearchGate.
6. To request recommendations/comments regarding professional activities from colleagues on LinkedIn.
7. To search for enterprises and organizations on LinkedIn relevant to the research topic for networking purposes.
8. To record achievements on the "Leader of the Year" platform.
9. To create a personal portfolio on the University Wiki-portal.

Topic 5. Computer Modeling in Scientific Research. Data Processing and Analysis

Modeling as a method of cognition. Types of modeling: mathematical modeling, simulation modeling. The concept of a Computer Model. Pedagogical modeling. Computer modeling methods. Model construction using Microsoft Excel.

System modeling (social, economic, information systems, etc.). Systems forecasting and optimization methods. Intelligent Computing techniques (Data Mining class systems).

Mathematical processing of research results.

Overview of information technologies used for processing and formatting research outputs. Utilizing the Analysis ToolPak in MS Excel.

Specialized statistical software packages (Statistica, SPSS, etc.). Fundamentals of applied statistics: probability, descriptive statistics, hypotheses and criteria, comparative statistics, correlation, and analysis of variance (ANOVA). Implementation examples of statistical calculations in MS Excel.

Modern digital technologies for data processing.

Key concepts: Modeling, Mathematical Modeling, Simulation Modeling, Computer Model, computer modeling methods, statistical data processing, digital data processing technologies.

Practical Class No. 3. Statistical Data Collection and Processing

1. To design a survey/questionnaire related to the research topic.
2. To process research data using the Analysis ToolPak in MS Excel, Statistica, SPSS, or other relevant software.

6. Assessment of PhD Students' Learning Achievement

6.1. Assessment System for PhD Students' Learning Achievement (Full-time)

Type of Activity	Maximum Points per Unit	Module 3	
		Number of Units	Maximum Score (Total Points)
Lecture attendance	1	5	5
Seminar attendance	1	3	3
Performance during seminars	10	3	30
Modular control	25	2	50
Self-study assignments	5	5	25
	Total	113/100=1,13	
	Coefficient	1,13	

Assessment System for PhD Students' Learning Achievement (Part-time)

Type of Activity	Maximum Points per Unit	Module 3	
		Number of Units	Maximum Score (Total Points)
Lecture attendance	1	1	1
Seminar attendance	1	3	3
Performance during seminars	10	3	30
Self-study assignments	5	15	75
	Total	109/100=1,09	
	Coefficient	1,09	

6.2. Self-study Assignments

CONTENT MODULE:
ICT IN MODERN SCIENTIFIC RESEARCH

Topic 1: Digital Transformation of Society, Economy, Science, and Education

1. Register on the Prometheus platform and complete the course: "Science of Le
2. Access the Diia.Education portal (https://osvita.diia.gov.ua/courses). Complete the "Basic Digital Skills" courses. Obtain the relevant certificates.
2. Access the Diia.Education portal. Complete the online course "Very Verified: An Online Course on Media Literacy" (https://osvita.diia.gov.ua/courses/very-verified). Obtain the certificate.
3. Complete the course "Cybernannies" (https://osvita.diia.gov.ua/courses/cybernanny) on the Diia.Education portal. Obtain the certificate.
5. Take the National Digital Literacy Test on the Diia.Education portal. (https://osvita.diia.gov.ua/digigram?gclid=cj0kcqiawmp9brczarisapwtj_f5mqe9xlv_byyygq785-tbtvkxl7bmtvjly4ihv8zfaddhq4etmwaamxbealw_wcb). Obtain the official certificate verifying the results.
6. Develop a personal digital competence development plan, based on the Digital Researcher Profile framework.
7. Register for and complete the online course "Digital Security and Online Communication" https://vumonline.ua/course/digital-security-and-communicationonline/ Obtain the certificate.
8. Register for and complete the online course "Media Literacy: Practical Skills" https://courses.prometheus.org.ua/courses/coursev1:CZ+MEDIA102+2018_T3/about Obtain the certificate.

Topic 2: ICT and Research Data Management

1. Investigate data management and dissemination issues within your specific research field. Formulate two key questions and create a virtual "whiteboard" for discussion with peers.
2. Prepare a brief review (2-3 pages) of publications from the last two years regarding data sharing and dissemination in your field.
3. Develop a long-term Data Management Plan (DMP) for your doctoral research project.
3. Complete the MOOC "Data Visualization" https://courses.prometheus.org.ua/courses/IRF/DV101/2016_T3/about. Obtain the certificate.
4. Provide examples for each stage of data lifecycle in your research (raw data, processed data, analyzed data, published data). Specify which data formats are most appropriate for your datasets.
5. Describe each stage of data formation in your research and prepare a corresponding report. Post the report on the course forum.

6. Complete the MOOC "Word and Excel: Tools and Hacks" (https://courses.prometheus.org.ua/courses/course-v1:DNU+PRIN101+2017_T1/about) Obtain the certificate.

7. Complete the following open courses on the Diia.Education portal:

- "Access to Public Information" (https://osvita.diia.gov.ua/courses/access-to-public-information)
- "Open Data for Business" (https://osvita.diia.gov.ua/courses/opendata

8. Complete the course on the EdEra platform: "SMART EXPORTER: Electronic Resources, Regulations, and Requirements for Exporting to the EU" (https://courses.ed-era.com/courses/course-v1:EdEra+ib103+IB103/about)

Topic 3: Digitalization of Scientific Research Stages

1. Complete the MOOC "Scientific Communication in the Digital Age" and obtain the certificate https://courses.prometheus.org.ua/courses/coursev1:UKMA+SCDA101+2020_T1/about
2. Create an individual software profile required to implement your dissertation research.
3. Develop a database of information sources (bibliographic database) to support your research.
4. Produce a video presentation on your research topic (duration: 6–9 minutes).
5. Design an infographic (static, dynamic, mind map, or timeline) related to your research topic using a digital service of your choice.
6. Compare various scientific communication services and present the findings using a visualization tool.
7. Create a Slack channel for your group based on your research theme. Post three interesting facts or news updates. Conduct a poll using Simple Poll or Polly. Submit a report with screenshots to Moodle.

Topic 4: Open Science. Scientific Communication and Collaboration Based on Digital Technologies

2. Analyze the "101 Innovations in Scholarly Communication". Select one tool from each category, explore its functionality, and create a mind map to be posted on the shared virtual whiteboard.
3. Explore the EU Open Science website. Prepare an information booklet using digital visualization tools.
4. Prepare a presentation on electronic scientific journal systems, focusing on the specifics of manuscript submission and the peer-review process.
5. Prepare a presentation on digital platforms for scientific conferences and the practicalities of their use.

the MOOC "Digital Communications in the Global Space" and obtain the certificate

Topic 5: Computer Modeling in Scientific Research. Data Processing and Analysis.

1. Complete the MOOC "Data Analysis and Statistical Inference in R" and obtain the certificate.
   https://courses.prometheus.org.ua/courses/IRF/Stat101/2016_T3/course/
2. Complete the following MOOCs and obtain certificates:

- "Fundamentals of Statistics"
- "Introduction to Descriptive Statistics"
- "Data Science: Visualization"

Assessment Criteria for Self-Study Work

Score (Points)	Assessment Criteria
4-5	The presented material fully or sufficiently covers the topic, contains additional informative data or explanations, and is formatted according to requirements.
2-3	There are inaccuracies in the presentation of the material; logical sequence is missing; there are flaws in formatting.
0-1	The work does not meet the requirements or is performed on a different topic; the material is presented only partially; factual errors are present in the content.

6.3. Forms of Modular Control and Assessment Criteria

Modular control is conducted in the form of a modular test based on a unified assessment system for PhD students' achievements.

Score (Points)	Assessment Criteria
23-25	The PhD student demonstrates deep, systematic knowledge of the topic, provides examples, and correctly answers the vast majority of questions; any errors are minor.
19-22	The student correctly structures the answer and allows minor errors that do not affect the overall result.
15-18	The student is familiar with the topic but lacks clarity in structuring the answer; allows errors that impair the accuracy of the response.
10-14	The response is superficial and lacks substantive content.
7-9	The response is at a primitive level.
1-6	The PhD student fails to demonstrate an understanding of the specified topic.

6.4. Forms of Semester Control

Semester control is conducted in the form of a Credit based on the results of current academic performance (continuous assessment) for the content module "ICT in Modern Scientific Research" within the course "Scientific Research Strategies."

6.5. Assessment of PhD Students' Academic Achievement by the ECTS System

Rating Grade	100-Point Scale Score	Meaning of the Grade
A	90-100	Excellent – an outstanding level of knowledge (skills) within the mandatory material with possible minor shortcomings
B	82-89	Very Good – a sufficiently high level of knowledge (skills) within the mandatory material without significant errors
C	75-81	Good – a generally good level of knowledge (skills) with a small number of errors
D	69-74	Satisfactory – an average level of knowledge (skills) with a significant number of shortcomings, sufficient for further study or professional activity
E	60-68	Sufficient – the minimum acceptable level of knowledge (skills)
FX	35-59	Unsatisfactory with the possibility of re-examination – an unsatisfactory level of knowledge, with the possibility of retaking the exam provided that proper independent study is conducted
F	1-34	Unsatisfactory with mandatory course repetition – a rather low level of knowledge (skills) that requires repeating the course

7. Recommended Reading
CONTENT MODULE:
ICT IN MODERN SCIENTIFIC RESEARCH

Topic 1: Digital Transformation of Society, Economy, Science, and Education.

Core Reading:

уменюк Людмила, Потапова Валентина, Волошенюк Оксана. Практична медіа г

нформаційно-аналітична підтримка педагогічних досліджень на основі електронних систем відкритого доступу: посібник / Іванова С. М., Кільченко М. В., Лабжинський Ю. А., Лупаренко Л. А., Новицька Т. Л., Одуд О. А., Спірін О. М., Ткаченко В. А., Шиненко М. А., Яцишин А. В. За наук. ред. проф. Спіріна О. М.; Ін-т інформ. технол. і засобів навч. НАПН України. – К., 2017 –

снови інформаційної безпеки: навчальний посібник. Лужицький В.А., / В.А.Лужицький, А.Д. Кожухівський, О.П. Войтович. – Вінниця: ВРТУ, 2013. - 221с.http://voytovych.vk.vntu.edu.ua/file/329641c3933b8b8cbe161af0c43785ee.pdf

4. Морзе Н.В., Кучеровська В.О., Смирнова-Трибульська Є.М. Самооцінювання рівня цифровізації освітнього закладу за умов трансформації середньої освіти. Електронне наукове фахове видання "Відкрите освітнє е-середовище сучасного університету". 2020. (8). С. 72-87. https://doi.org/10.28925/2414-9325.2020.8.8 URL: https://openedu.kubg.edu.ua/journal/index.php/openedu/article/view/305/313
5. Назаровець М. А. GOOGLE АКАДЕМІЯ ДЛЯ НАУКОВЦІВ Практичний посібник. Київ – 2016 (http://www.library.univ.kiev.ua/ukr/res/google_scholar.pdf)

нис цифрової компетентності педагогічного працівника (2019). Режим

7. Розпорядження Кабінету міністрів України. Про схвалення Концепції розвитку цифрової економіки та суспільства України на 2018-2020 роки та затвердження плану заходів щодо її реалізації» від 17 січня 2018 р. № 67-р.http://zakon3.rada.gov.ua/laws/show/67-2018-p
8. Профіль науковця в ORCID: реєстрація та наповнення. Практичний посібник

Цифрова адженда України – 2020. (2016) (“Цифровий порядок денний”–2020). Концептуальні засади (версія 1.0). Першочергові сфери, ініціативи, проекти

10. ICT Profiles. 30 European ICT Professional Role Profiles built on the e-CF. Available at: https://www.ecompetences.eu/ict-professional-profiles/

Supplementary Reading:

Міністерство освіти і науки України, “Дорожна карта інтеграції України до Європейського дослідницького простору (ERA–UA)”, 2018. [Електронний ресурс]. Режим доступу: https://mon.gov.ua/storage/app/media/kolegiya–

15.: Muluk, T. (2016, April). ICT in Education for Digital Transformation. /[Presentation]. ITU Regional Workshop for CIS on “Strengthening Capacity /Building in the field of Telecommunications/ICT”. April 12-14, 2016. Odessa (uUkraine). Retrieved from: https://www.itu.int/en/ITU-D/RegionalcPresence/CIS/Documents/Events/2017/04_Odessa/Presentations/ITU%20Worksho cp%2012.04-Turhan%20Muluk.pdf (accessed on 29.10.2020).
16.i Westerman G., Bonnet D., McAfee A. The nine elements of digital transformation .// MIT Sloan Management Review. Opinion & Analysis. January 07, 2014. URL: ohttps://sloanreview.mit.edu/article/thenine-elements-of-digital-rtransformation/?social_token=d65abc6db70ba459408562abb8de32bc&utm_source g=facebook&utm_medium=social&utm_campaign=sm-direct
17. Wildan, M.W., Umri, A.I., Hashim, H.U., Dahlan, A.R.A. A Business Case for Digital Transformation of a Malaysianu -Based University. In Proceedings of the 2018 aInternational Conference on Information and Communication Technology for the /MuslimWorld (ICT4M), Kuala Lumpur, Malaysia, 23-25 July 2018; IEEE: uPiscataway, NJ, USA, 2018; pp. 106-109. DOI: 10.1109/ICT4M.2018.00028.
18. The digital transformation of education: connecting schools, empowering learners l(2020, September). UNESCO. 2020. 138 p. ISBN:978-92-61-32261-8. Retrieved from: o https://unesdoc.unesco.org/ark:/48223/pf0000374309 (accessed on a28.10.2020).
19.d OECD/European Union (2019). “Digital transformation and capabilities”, in sSupporting Entrepreneurship and Innovation in Higher Education in Italy, OECD /Publishing, Paris. DOI: https://doi.org/10.1787/6cc2e0a5-en. Retrieved from: fhttps://www.oecd-ilibrary.org/docserver/6cc2e0a5ien.pdf?expires=1604150362&id=id&accname=guest&checksum=FC58B4F733A9 lE534F623AED2F81FEF50 (accessed on 28.10.2020).

Topic 2: ICT and Research Data Management

Core Reading:

1. Борисова Тетяна. Що треба знати, перш ніж поширювати дані? : [презентація до семінару "Цифрова підтримка наукових досліджень", 9 жовтня 2017, НаУКМА, Київ] - http://ekmair.ukma.edu.ua/handle/123456789/11976 2. Відкритий посібник з відкритих даних [Електронний ресурс] / упоряд. Данило Кубай, Андрій Газін ; Укр. освіт. центр реформ, Укр. центр суспільних даних. - Київ, 2016. - Режим доступу: http://socialdata.org.ua/manual/. - Дата звернення: 14.09.2016.
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Topic 3: Digitalization of Scientific Research Stages:

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Topic 5: Computer Modeling in Scientific Research. Data Processing and Analysis

Core Reading:

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Matrix of Correspondence between Course Competencies and Learning Outcomes

Educational-Scientific Programme (ESP)	*"Philosophy"*
GC 1.	Ability to generate new ideas (creativity).
GC 2.	Ability to identify, formulate and solve problems.
GC 3.	Ability to work in an international context.
GC 4.	Ability to develop projects and manage them.
GC 5.	The ability to solve complex problems in philosophy based on a systematic scientific worldview and general cultural knowledge, while adhering to the principles of professional ethics and academic integrity
GCU 6.	The ability for scientific research; development of personally significant qualities of a researcher; goal setting, formulation of tasks, hypothesis formulation, development of research strategy; ability to create a research plan, solve research tasks, generate and interpret new knowledge in accordance with the topic of scientific research.
GCU 7.	The ability for self-improvement and continuous professional education
SC 1.	The ability to conduct original research, achieve scientific results that generate new knowledge in philosophy and related interdisciplinary fields, and have the potential for publication in leading scientific journals in philosophy and related areas.
SC 2.	The ability to orally and in writing present and discuss the results of scientific research in Ukrainian and foreign languages, as well as a deep understanding of scientific texts in foreign languages related to the research area.
SC 3.	The ability to apply methods of philosophical and interdisciplinary research, identify their heuristic possibilities and limitations, and utilize relevant research tools.

SC 5.	The ability to analyze, systematize, and synthesize the results of interdisciplinary scientific research in the field of philosophy, evaluate the current state and trends in the development of philosophy
SC 6.	The ability to identify, formulate, and solve research problems in the field of philosophy, evaluate and ensure the quality of conducted research.
SCU 8.	The ability to comprehend contemporary scientific methodology; conduct research activities related to the analysis of society and education using theoretical and empirical methods; methodologically and technologically competent execution of scientific research and interpretation of its results; effective dissemination and dissemination of knowledge regarding scientific research and innovations.
LO 1	To possess advanced conceptual and methodological knowledge in philosophy and at the boundaries of disciplinary fields, as well as research skills sufficient for conducting scientific and applied research at the level of global achievements in philosophy, acquiring new knowledge, and implementing innovations.
LO 2.	To proficiently present and discuss research findings, scientific and applied problems in philosophy with both specialists and non-specialists, using the national and foreign languages, and to publish research results in scientific publications in leading academic journals.
LO 3.	Effectively apply knowledge of the fundamental principles of theoretical and practical philosophy, the history of global and national philosophical thought, as well as major trends and leading tendencies in contemporary world philosophy in professional activities.
LO 4.	Formulate and test hypotheses; utilize appropriate evidence to support conclusions, including results from theoretical analysis, applied research, existing literature data; analyze the researched problem considering a broad intellectual and socio-cultural context.
LO 5.	Plan and conduct theoretical research in philosophy and related interdisciplinary fields using modern tools; critically analyze the results of one's own research and the findings of other researchers in the context of the entire body of contemporary knowledge regarding the investigated problem.
LO 6.	Deeply comprehend the general principles and methods of philosophical sciences, as well as the methodology of scientific

	research, and apply them in one's own research in the field of philosophy and in teaching practice.
LO 7.	Apply modern tools and technologies for information search, processing, and analysis, including statistical methods for analyzing large and complex datasets, specialized databases, and information systems.
LO 8.	Develop and implement scientific and innovative projects that contribute to creating new integrated knowledge and professional practice and address significant philosophical research problems considering social, economic, environmental, and legal aspects.
LO 11.	Work with scientific texts from specialized literary sources and the Internet, identify and shape new ideas and relevant scientific problems, and create a research plan.
LO 12.	Conduct a comparative analysis of complex phenomena and processes in the context of domestic and international scientific investigations, particularly in social philosophy or philosophy of education.