



COURSE CATALOG

Summer Semester 2023

within the project DILLUGIS

(Digital Labs & Lectures for Ukrainian, German & International Students)

Implemented with the support of the GERMAN ACADEMIC EXCHANGE SERVICE DAAD as part of the «Ukraine digital: Ensuring academic success in times of crisis» initiative



About the project

The DILLUGIS (Digital Labs & Lectures for Ukrainian, German & International Students) project provides for the inclusion of students and lecturers of the NU «Zaporizhzhya Polytechnic», NTUU «Ihor Sikorsky Kyiv Polytechnic Institute» and Odessa State Agrarian University in the digital training in the courses of the East Bavarian University Amberg-Weiden Digital Technology and Management program. Also, professors will work together to develop new digital courses and digital labs for students.

Also the project provides for the holding of two powerful events «Ukrainian-German Teaching Week» and «Workshop for lecturers: using digital technologies in educational process» with the possibility of lectures and students participation either in face-to-face or in online format

The project is implemented with the support of the German academic exchange service DAAD as part of the «Ukraine digital: Ensuring academic success in times of crisis» initiative.

Інформація про проєкт

Проєкт DILLUGIS (Digital Labs & Lectures for Ukrainian, German & International Students) передбачає залучення студентів та викладачів НУ «Запорізька політехніка», НТУУ «Київський політехнічний інститут імені Ігоря Сікорського» та Одеського державного аграрного університету до цифрового навчання за окремими курсами освітньої програми «Цифрові технології і менеджмент» Східно-Баварського університету Амберг-Вайден. Спільними зусиллями викладачі працюватимуть над розробкою нових цифрових лабораторних робіт для студентів.

Також проєкт передбачає проведення двох потужних заходів «Українсько-німецький навчальний тиждень» та «Майстерня для викладачів: використання цифрових технологій у навчальному процесі» з можливістю читання лекцій та участі студентів як в очному, так і в онлайн-форматі.

Проєкт реалізується за підтримки німецької служби академічних обмінів DAAD в рамках ініціативи «Ukraine digital: Ensuring academic success in times of crisis».

Why this is important for Ukrainian students

- involvement in the international educational environment through online courses of the Digital Technology and Management program in East Bavarian University Amberg-Weiden (<https://www.oth-aw.de/en/>)
- the possibility of obtaining modern knowledge, skills and competences, that meet the requirements of the European labor market, from specialists of German technological companies (Siemens, OnraSens) and professors of a German university, whose courses have a significant practical orientation
- access to the digital educational materials and participation in digital labs and practical works
- getting the experience of participation in the academic mobility program and implementation of the international project DILLUGIS (Digital Labs & Lectures for Ukrainian, German & International Students) with the support of the German academic exchange service DAAD
- improvement of English language knowledge
- participation in multicultural educational process
- receiving a certificate from the East Bavarian University Amberg-Weiden (in case of successful completion of the course)
- the possibility of re-enrollment in Ukrainian university of the studied discipline (course) in accordance with the Regulation on academic mobility
- acquisition of knowledge and skills that go beyond the traditional educational program in frames of non-formal education
- familiarization with the educational environment of East Bavarian University Amberg-Weiden for the future continuation of studies within the framework of international academic mobility and internationalization of education.

Чому це важливо для українських студентів

- долучення до міжнародного освітнього середовища шляхом онлайн-навчання за курсами програми «Цифрові технології і менеджмент» потужного німецького університету Східно-Баварського університету Амберг-Вайден (<https://www.oth-aw.de/en/>)
- можливість одержання сучасних знань, навичок і компетенцій, що відповідають вимогам європейського ринку праці, від фахівців німецьких технологічних компаній (Siemens, OnraSens) та професорів німецького університету, чії курси мають суттєву практичну спрямованість
- користування цифровим навчальним матеріалами та участь у цифрових лабораторних і практичних роботах
- досвід участі у програмі академічної мобільності та реалізації міжнародного проєкту DILLUGIS (Digital Labs & Lectures for Ukrainian, German & International Students) за підтримки Німецької служби академічного обміну DAAD
- досвід навчання в середовищі міжнародних студентів
- вдосконалення знання англійської мови професійного спрямування
- одержання сертифікату Східно-Баварського університету Амберг-Вайден (у разі успішного проходження курсу, із зазначенням модулів, змісту та тривалості курсу, отриманих компетенцій и навичок)
- можливість перезарахування в українському університеті вивченої навчальної дисципліни (курсу) відповідно до Положення про академічну мобільність
- здобуття знань та навичок, які виходять за межі традиційної освітньої програми в рамках неформальної освіти
- ознайомлення з освітнім середовищем Східно-Баварського університету Амберг-Вайден для продовження в перспективі навчання в межах міжнародної академічної мобільності та інтернаціоналізації освіти.

About Digital Technology and Management program

Digitalization, connectivity, big data and AI, but also globalization have revolutionized the way companies are run. These megatrends impact not only the product and service offerings of companies. They are also fundamentally changing how companies develop, procure, produce and market, and how they earn money as a result.

Про програму «Цифрові технології і менеджмент»

Цифровізація, комунікації, BigData та штучний інтелект, а також глобалізація кардинально змінили спосіб управління компаніями. Ці мегатренди впливають не лише на пропозиції компаніями товарів і послуг. Вони також докорінно змінюють те, як компанії розробляють, закуповують, виробляють і продають, і як в результаті вони заробляють гроші.

To master this transformation, we need graduates

- who think and act in an interdisciplinary, cross-functional and interfacing way;
- who have a deep understanding of digital technologies as well as management know-how;
- who possess language skills and intercultural competencies;
- who are creative and at the same time strong in implementation;
- who are able to familiarize themselves with ever new topics while still keeping an eye on the old.

Щоб освоїти цю трансформацію, потрібні випускники:

- які мислять і діють у міждисциплінарний, міжфункціональний та взаємодіючий спосіб;
- які мають глибоке розуміння цифрових технологій, а також управлінські ноу-хау;
- які володіють мовними та міжкультурними навичками;
- які є креативними і водночас сильними у реалізації;
- які можуть знайомитися з постійно новими темами, в той же час володіючи старими.

These are exactly the competencies you will acquire in the Digital Technology and Management program!

Саме такі компетенції студенти отримують на програмі «Цифрові технології та менеджмент» Східно-Баварського університету Амберг-Вайден!





Disciplines/courses (volume of each course – 5 credits ECTS) Дисципліни/курси (обсяг кожного курсу – 5 кредитів ECTS):

Algorithms and Data Structures (Алгоритми та структури даних)

Business Processes Management (Управління бізнес-процесами)

Industrial Engineering (Промислова інженерія)

Communication Technology (Комунікаційні технології)

Information Systems and Databases (Інформаційні системи та бази даних)

Product Management (Управління продуктами)

German Starter 1 – German language course (Курс німецької мови для початківців)

Pre Intermediate 1 – German language course (Курс німецької мови для студентів із базовим рівнем німецької мови)

The important organizational points

1. The training will take place in an online format according to the courses of the «Digital Technology and Management» program of the East Bavarian University Amberg-Weiden.
2. The language of education and communication is English.
3. During the entire period of study, support from Ukrainian-speaking professors is provided.
4. The start of online classes - March 16, 2023, the end of classes and final assessment – June 30, 2023.
5. Mandatory participation in at least 80% of online classes.
6. The number of students participating in the project is limited.

Важливі організаційні моменти

1. Навчання відбуватиметься в онлайн форматі за курсами навчальної програми «Цифрові технології і менеджмент» Східно-Баварського університету Амберг-Вайден.
2. Мова навчання та комунікації - англійська.
3. Протягом всього періоду навчання передбачена підтримка з боку україномовних професорів.
4. Початок он-лайн занять - 16 березня 2023 року, закінчення занять і підсумкове оцінювання – 30 червня 2023 року.
5. Обов'язкова участь у не менше, ніж 80% он-лайн занять.
6. Кількість студентів, що беруть участь у проєкті, обмежена.

How to participate in the academic mobility program DILLUGIS project (Digital Labs & Lectures for Ukrainian, German & International Students)

1. Carefully read the information about the project and decide whether you need it.
2. Choose the courses/disciplines that you are interested in among those that will be studied online at the East Bavarian University Amberg-Weiden, after thoroughly familiarizing yourself with their structure, competencies and skills.
3. Fill out the application form with brief information about yourself, chosen courses and explaining of the importance of participating in the project (2-3 sentences).
4. Have a short interview with the project coordinators.
5. Receive a confirmation letter about enrollment in courses.
6. Take part in the organizational meeting and receive the class schedule.
7. Take part in online lectures and digital practical activities.
8. Pass the final assessment and receive a certificate.

Як взяти участь у програмі академічної мобільності за проєктом DILLUGIS (Digital Labs & Lectures for Ukrainian, German & International Students)

1. Уважно прочитати інформацію про проєкт та прийняти рішення, чи потрібно тобі це.
2. Обрати цікаві для тебе курси/дисципліни, які будуть вивчатися он-лайн в Східно-Баварському університеті Амберг-Вайден, після ретельного ознайомлення з їх структурою, компетенціями та навичками.
3. Заповнити апікаційну форму з короткою інформацією про себе, обрані курси та обґрунтуванням важливості участі у проєкті (2-3 речення).
4. Пройти невелику співбесіду з координаторами проєкту.
5. Отримати лист-підтвердження про зарахування на курси.
6. Прийняти участь в організаційному зібранні та отримати розклад занять.
7. Взяти участь в он-лайн лекціях та цифрових практичних заняттях.
8. Пройти підсумкове оцінювання та отримати сертифікат.

Algorithms and Data Structures

A unique course from a German professor on the basic algorithms in an object-oriented software development

Professor / Lecturer	Course Content
Prof. Dr.-Ing. Manfred Beham	<p>Introduction: Algorithms, Analysing algorithms, Designing algorithms, Recursive procedures, Exemplary implementation (using JAVA)</p> <p>Data structures: Elementary data structures, Hash tables, Binary trees, OO Modelling</p> <p>Sorting and Order Statistics: Heapsort, Quicksort, Sorting in linear time</p> <p>Graph Algorithms: Elementary search algorithms, Shortest path search, Selected game algorithms</p> <p>Selected topics: Algorithms for parallel computers, Matrix operations, String matching, RSA public-key cryptosystem.</p>

Teaching Methods	Number of Credits (ECTS)	Workload
Lecture with exercises; instruction seminars; practical work in programming	5	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- Students can analyse existing algorithms concerning complexity.
- They can make use of elementary data-structures and predefined operations within their own software applications.
- Students will learn the elementary skills to implement basic algorithms in an object-oriented software development environment.

Methodological Skills:

- Students can use UML to create a static class model of elementary data-structures.
- Students will describe complexity of algorithms by a standard asymptotic notation.

Personal Skills (Social Competence and Self-competence):

- Students are also able to present solutions that have been created, to discuss their quality and alternatives and to reflect on their problem-solving strategy in a technical and methodical manner.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

Business Processes Management

Professor / Lecturer	Course Content
Information about the lecturer will be announced later	<p>Fundamentals of business process management, process modeling, process optimization and process execution</p> <p>Business Process Modeling with different modeling techniques (e.g., EPC, BPMN)</p> <p>Methods of process design, process optimization</p> <p>Usage of current BPM tools</p> <p>Structure, sub-processes and activities of operational, production-related business processes</p> <p>Dissemination and functionality of operational planning systems as actors of a business process</p> <p>Relevant data types and sources for software-supported business processes</p> <p>Types of integration in the context of software-supported business processes</p>

Teaching Methods	Number of Credits (ECTS)	Workload
Lecture, seminar with exercises, computer exercise	5	Contact time: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional and Methodological Skills:

- Define and describe important terms and concepts in the field of business processes.
- Use methods of business process modelling.
- Recognize possibilities for the optimization of business processes and plan their realization.
- Execute the most important software-based core business processes of a company.
- Capture the context and the integration of the most important production-related data, functions and documents in business.
- Identify, collect, assess and transfer relevant and necessary data for the software-supported execution of real business processes.

Personal Skills (Social Competence and Self-competence):

- The students approach their own projects in an open and structured way.
- They are familiar with intervention techniques in organisations and are able to use them.
- They are able to work and communicate cooperatively as a team in order to solve a problem in the field of process management in a joint discussion.
- And they can independently expand and deepen the acquired knowledge and competences.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Written Exam (K190)	Written Exam, 90 minutes	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

Communication Technology

Professor / Lecturer	Course Content
Information about the lecturer will be announced later	<p>in-depth study of the technologies and protocols involved in building the Internet-of-Things (IoT)</p> <p>understanding of wireless communication and link layer technologies, multi-access and scheduling mechanisms, mobility models, routing in disconnected networks, energy-efficient edge networking, loss tolerant transport protocols, and their applications to emerging areas such as vehicular networks, RFID systems and smart buildings.</p> <p>IoT Security and data/content distribution, aggregation, and compression.</p> <p>This course also offers the possibility of an hands-on experience utilizing Raspberry Pi's, Arduino's, and NI software radio boards; for bonus system, a project focused on building a wireless based application such as indoor localization for IoT devices can be done.</p>

Teaching Methods	Number of Credits (ECTS)	Workload
Lecture; case studies; practical exercise; demonstration	5	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Students will be able to describe the components and functions of communications technology required for IoT, apply them to simple problems and critically reflect on them, especially with regard to security aspects.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Written Exam (K190)	Written Exam, 90 minutes Information about multiple-choice questions and a possible bonus system will be provided starting in the semester the module is taught for the first time	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

Industrial Engineering

Engage yourself with a methodological toolkit that can be helpful in all disciplines of an industrial company, such as production, logistics, procurement or quality management

Professor / Lecturer	Course Content
<p>Since 2020, Andreas Dörner has been working in the field of digital logistics at an automotive supplier and, since 2021, he has also been involved part-time as a research assistant in Industry 4.0 Informatics at the OTH Amberg-Weiden in setting up a digital model factory there. His research interests include, in particular, possible fields of application for various assistive technologies in industrial production and their influence on efficiency, quality and ergonomics.</p>	<p>Basic documents (drawings, parts lists, work plans) and essential tasks of order processing in manufacturing companies, i. a. from the areas of work planning, purchasing, production and assembly.</p>

Teaching Methods	Number of Credits (ECTS)	Workload
Lectures with integrated practical demonstrations and exercises	5	Contact time/coaching: 60 h Self-study: 90 h Total workload: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- Students will be able to explain the essential basics and core functions of operational performance (focus: production of goods) and their interrelationships.
- They can apply selected calculation methods.

Methodological Skills:

- Students can comprehend technical contents and use them in a problem-oriented manner.

Personal Skills (Social Competence and Self-competence):

- Students can participate in discussions on the topic using the specific vocabulary.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

Information Systems and Databases

The course from an experienced specialist in information technology with her own scientific developments in databases designing

Professor / Lecturer	Course Content
<p>Prof. Dr. phil. Dr. rer. nat. Theresa Götz, has two doctorates – in physics and information science.</p>	<p>Information systems within a company Business process analysis with OO methods for system analysis and system design Notation in UML Relational database systems and their application Development of a relational schema Basics of SQL-queries Exercises in designing and using a exemplary relational database</p>

Teaching Methods	Number of Credits (ECTS)	Workload
Lecture; instruction seminars; practical exercise	5	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- You can design and implement a relational database.
- You can obtain information from relational databases with the help of elementary SQL queries.

Methodological Skills:

- You can analyze operational processes with object-oriented methods and document them using the UML notation.
- You can create an object-oriented concept for a simple, operational application system.
- You can transform a class-model into a relational schema.

Personal Skills (Social Competence and Self-competence):

- You have the ability to describe complex information structures with abstract models.
- You are familiar with the basics of process management for working in a team on an IT project.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Written Exam (Kl90)	Written Exam, 90 minutes	With the exam and a possible bonus exercise, all of the above-mentioned competencies are tested.

Product Management

The course from a specialist in product management in the medical industry

Professor / Lecturer	Course Content	
Dr. Manuel Stich, expert in Product Management Oncology at Siemens Healthineers	Definition of the role of product management with its tasks and objectives. Integration of product management into different product development models and its interfaces to other roles and areas in the company. Requirements and market analysis and ways to generate new product ideas. Product portfolio management Development and derivation of an appropriate product development strategy and product roadmap. Influence in the product marketing mix and establishment of marketing strategies. Participation and influence in the product development process and product life cycle. Product launch opportunities and subsequent control. Digital business transformation and its influence on product management. Different characteristics and lifestyles of product management in the enterprise: Startup vs. SME vs. corporation.	
Teaching Methods	Number of Credits (ECTS)	Workload
Lecture; class discussion; case studies; field trip; guest lecture	5	Contact time: 60 h Self-study: 60 h Module work preparation: 30 h Total effort: 150 hh

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

Professional Skills:

- Students have knowledge of how product management fits into a modern, lean and agile corporate structure and are familiar with the interfaces to other areas and roles in the company.
- The students learn how to analyze and evaluate suitable markets for product launches. In addition, the students know possibilities for the collection of customer requirements in the area of requirements analysis.
- The students know possible product strategies and can apply them practically.
- The students know the gates and phases of the product development cycle from the product manager's point of view and know his task and influence in the entire product life cycle.

Methodological Skills: Students learn methods...

- for idea generation and evaluation for new products.
- for market analysis and generation of a product launch strategy.
- for identifying, structuring and prioritizing customer requirements.
- and know its role and influence throughout the product life cycle.

Personal Skills (Social Competence and Self-competence):

- Team-oriented processing of examples and case studies in the field of product management.
- Communication and presentation of results from individual and group work.

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/Competencies to be Assessed
Module work (ModA)	Group project with individual presentations: Elaboration of a topic/case study	The group project is used to test the practical learning content and competence profiles, including teamwork and presentation skills.

German Starter 1

German language course for participants with little knowledge of German

Professor / Lecturer	Course Content
Information about the lecturer will be announced later	This basic course covers a first insight and practical training of the German standard language. Typical matters of the students in everyday situations along with basic vocabulary are important. Basic grammar is introduced, revised and refreshed. A variety of basic topics and authentic situations from daily life are used, e.g. grocery shopping, small talk, orientation in the city.

Teaching Methods	Number of Credits (ECTS)	Workload
Interactive language course; Homework for self-study and consolidation of the new grammar and vocabulary	5	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

After completing this module successfully, students will have the following professional, methodological and personal competences:

Students acquire the basics of the foreign language (basic vocabulary and simple grammatical structures) in all language skills (listening, reading, writing, speaking) for simple and direct exchange of information in everyday situations. Students can introduce themselves and others and can ask and answer questions about personal details such as where they live, people they know and things they have; they can interact in a simple way provided the other person talks slowly and clearly and is prepared to help. (Taken from the CEFR)

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/ Competencies to be Assessed
portfolio examination	<p>Written examination (reading comprehension + text production + listening comprehension) of 90 minutes (75%)</p> <ul style="list-style-type: none"> written part (consists of text production and reading comprehension) oral part (consists of listening comprehension and language skills). Both parts must be passed with at least 4.0 (50%). <p>A pass in speaking skills is considered a prerequisite for admission to the written examination. The passed certificates of achievement remain valid for a maximum of two years</p>	The entire learning contents and competence profiles are assessed by way of the aforementioned examination forms.

Pre Intermediate 1

German language course for participants with a basic knowledge of German

Professor / Lecturer	Course Content
Information about the lecturer will be announced later	The pre-Intermediate course offers practical training of the German standard language. Typical matters of the students in everyday situations are important. A major goal is the application of the correct use of grammar, the understanding of authentic texts (reading and listening comprehension) and the production of typical texts related to everyday life and studies. Developing and practicing communicative skills is trained. A variety of basic topics and authentic situations from daily life are used, e.g. housing, shopping, health, environment.

Teaching Methods	Number of Credits (ECTS)	Workload
Interactive language course; Homework for self-study and consolidation of the new grammar and vocabulary	5	Contact time: 60 h Self-study: 60 h Exam preparation: 30 h Total effort: 150 h

Learning Outcomes

After successful completion of the module, students will have acquired the following professional, methodological and personal skills and competencies:

After completing this module successfully, students will have the following professional, methodological and personal competences:

Students are able to understand simple sentences and frequently used expressions on general or study-related topics through listening or reading, to give information on selected topics of immediate relevance through simple linguistic means and to write short messages.

Students can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need. (Taken from the CEFR)

Method of Assessment

Form of Examination	Type/Scope incl. Weighting	Learning Objectives/ Competencies to be Assessed
portfolio examination	Written examination (reading comprehension + text production + listening comprehension) of 90 minutes (75%) <ul style="list-style-type: none"> • written part (consists of text production and reading comprehension) • oral part (consists of listening comprehension and language skills). Both parts must be passed with at least 4.0 (50%). <ul style="list-style-type: none"> • A pass in speaking skills is considered a prerequisite for admission to the written examination. The passed certificates of achievement remain valid for a maximum of two years 	The entire learning contents and competence profiles are assessed by way of the aforementioned examination forms.