



GURU GOBIND SINGH
INDRAPRASTHA
UNIVERSITY IPU
NEW DELHI



GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

Sector 16 C, Dwarka, New Delhi - 110078 (India)
(A State University Established by Govt. of NCT of Delhi)



AGH UNIVERSITY OF KRAKOW

Adama Mickiewicza 30, 30-059 Kraków, Poland
(A Public University of Poland)



Dual Degree Master of Science (Digital Production for Sustainable Manufacturing)

Admission Brochure For Academic Session 2026-27

For further information, please visit : www.ipu.ac.in

Contact us: dean.usar@ipu.ac.in

**ADMISSION TO MASTER OF SCIENCE
(DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING)
DUAL-DEGREE PROGRAMME - 2026-27**

Applications are invited for admission to the Dual-degree Master of Science program in Digital Production for Sustainable Manufacturing in collaboration with AGH University of Krakow, Krakow, Poland.

- i. The program shall be offered by the University School of Automation and Robotics (GGSIPU, New Delhi, India) in collaboration with the Faculty of Management Studies (AGH University of Krakow, Krakow, Poland). The duration of the program is four Semester;
- ii. URL for Online Application is :- <https://forms.gle/98wmT4bPJFew1R3a8>
- iii. Delivery of the program shall start from February 2027;
- iv. The fee of the program shall be equivalent to the MBA Program fee at GGSIPU for existing programs;
- v. The program plan is as follows–
 - a. Semester One (February 2027 to June 2027) : At AGH University of Krakow, Poland;
 - b. Semester Two (July 2027 to December 2027) : At AGH University of Krakow, Poland;
 - c. Semester Three (February 2028 to June 2028): At USAR, GGSIPU EDC, India;
 - d. Semester Four (August 2028 to December 2028): Internship at GGSIPU, India



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1. About University School of Automation and Robotics(USAR) :

The University School of Automation & Robotics (USAR) is one of the premier University School of Studies(USS) located in Guru Gobind Singh Indraprastha University (GGSIPU), East Delhi Campus. Established in 2021, USAR is designed as a future-focused institution dedicated to emerging technologies. USAR offers:

- ❖ Integrated B.Tech/M.Tech dual degree programs [4+2 years] in cutting-edge domains such as:
 - Automation & Robotics (AR)
 - Artificial Intelligence & Machine Learning (AIML)
 - Artificial Intelligence & Data Science (AIDS)
 - Industrial Internet of Things (IIoT)
- ❖ PhD Program in above disciplines.

USAR's curriculum is structured to be industry-oriented, emphasizing practical learning, innovation, and real-world application. The campus is equipped with state-of-the-art laboratories and modern infrastructure, enabling students to develop hands-on expertise in automation and advanced technologies

2. Common minimum eligibility criteria for admission to Master of Science (Digital Production for Sustainable Manufacturing) Programme 2026-27:

- 2.1 Engineering Graduate in any discipline with at least 60% Marks.
- 2.2 In cases where the marks of the qualifying examination are not given by the degree awarding recognized University/ Institution, candidates, who have obtained a minimum of 60% marks in aggregate or its equivalent grade in a point scale wherever the grading system is followed, in the relevant Undergraduate Examination, shall be considered eligible to seek admission to the Master of Science (Digital Production for Sustainable Manufacturing), the concerned candidates shall be required to submit an undertaking that their University/ Institution does not give marks for the said qualifying examination.
- 2.3 A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-abled/Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.

Note: The eligibility criteria and procedure for admission as specified in this admission brochure are subject to changes made in the ordinances, rules and regulations by the University from time to time, as per the decision of University and/or statutory bodies governing various programmes. The reservation policy shall be implemented in accordance with the Govt. of India and Govt. of NCT rules as applicable.

3. Procedure for Admission

- 3.1 In line with UGC guidelines for dual degree programmes involving collaboration with foreign educational institutions, all candidates seeking admission for Master of Science (Digital Production for Sustainable Manufacturing) Programme 2026-27 shall have to apply for admission to the GGSIPU, India as well as AGH University Krakow by filling up the online application forms available at the websites of the respective Universities.
- 3.2 Reservation shall be as per the State Reservation Policy, notified by the GGSIPU from time to time. The admission to the Master of Science (Digital Production for Sustainable Manufacturing) programmes shall be done on an All-India basis.
- 3.3 The University may decide the number of eligible students to be called for interview based on the number of seats available.
- 3.4 Admission to the Master of Science (Digital Production for Sustainable Manufacturing) programme shall be on merit based on marks at Graduation Level and performance in the interview. The interview shall consider the following aspects, viz.
 - (a) Educational background;
 - (b) Domain specific knowledge;
 - (c) The candidate suitability and overall personality;
 - (d) Basic knowledge and aptitude for the programme.

- 3.5 **70% weightage will be given to merit based on marks at graduation level and personal interview will carry 30% weightage.**

Note: The University also reserves the right not to fill any of seat or cancel the admission procedure.

4. **Important Instructions:**

- 4.1 The term “University” in this admission brochure shall mean Guru Gobind Singh Indraprastha University.
- 4.2 The term “AGH University Krakow” in this admission brochure shall mean AGH University of Krakow, Krakow, Poland.
- 4.3 The application forms shall be available in the online mode only on the University Website: of GGSIPU (<http://www.ipu.ac.in>) and AGH University of Krakow (<https://www.international.agh.edu.pl/en>)
- 4.4 The last date of application may be extended for the programme.
- 4.5 It is the responsibility of the candidates to ascertain whether he/she possess the requisite eligibility and qualifications for admission. Applying for the programme does not necessarily mean acceptance of eligibility (as defined earlier). Every applicant applying for the programme must satisfy the eligibility criterion as specified in this brochure (or its amendments / corrections).
- 4.6 The applicants are advised that since the form filling shall be made available through the online mode only, they must keep the details of their login id and the password secure and safe.
- 4.7 Applicants should be careful in choosing programme that they apply for, as no change would be permissible after the application has been submitted.
- 4.8 After the application for the programme is submitted, if there is any mistake in date of birth, spelling mistake in name of applicants or the parents name or in the choice of category/region claimed for the purpose of availing reservation, the applicant can correct the details online within 3 days of closing the registration window by using own individual account login ID and Password. The date of registration open and close will be notified later on.
- 4.9 No separate intimation will be sent to the candidates regarding display of merit list and commencement of interview/admission. All the information will be displayed on the websites of GGSIPU (<http://www.ipu.ac.in>) and AGH University of Krakow (<https://www.agh.edu.pl/>).
- 4.10 Applicants should retain a printout of the application form as proof of applying for the programme.
- 4.11 In all communications regarding submission of application or otherwise related to admission, the copy of the application form must be submitted as otherwise the communication would be deemed incomplete and no processing would be performed on the communication, without any notice to the applicant.
- 4.12 There will be no rounding-off of the percentage of marks of qualifying examination while deciding the basic eligibility of any candidate for admission

e.g. if a candidate obtained 59.99% marks in his/her qualifying examination, it will not be rounded-off to 60%.

- 4.13 If the University or the statutory regulatory body of the programme of study specifies the medical examination of the candidate, then all admitted students must present themselves for medical examination. If the student/candidate fails the medical examination, the admission of the candidate/student shall be cancelled by the University.
- 4.14 The candidate must possess valid passport issued by the Govt. of India.
- 4.15 The candidates are advised to check the status of their application with the help of the login id and password.
- 4.16 Write the complete e-mail address and phone number in the form carefully. Please note that this email address and phone number may be used by the University for future communication.
- 4.17 The nomenclature of degrees to the admitted programmes of studies shall be as per the notification of the University Grants Commission for "Specification of Degrees".
- 4.18 The University shall not issue any certificate of equivalence to any other programme of study. That is, if a student is awarded a degree by the University and desires a certificate regarding its equivalence to some other degree, then the request of the student for such equivalence certificate shall be summarily rejected.
- 4.19 No admitted student pursuing a programme of study from Guru Gobind Singh Indraprastha University is allowed to pursue any other (2nd or more) degree / diploma programme of study from any University including GGSIPU. If at any stage it is found that an admitted student has registered for more than one programme of study in GGSIPU or any other University, the admission of such a candidate shall be cancelled from all programmes of studies of GGSIPU.
- 4.20 All candidates desirous of seeking admission to the programme shall be bound by the conditions as laid down in this admission brochure; and the rules and regulations as enshrined in the University Act, Statutes, Ordinances, notifications and guidelines issued from time to time.
- 4.21 The medium of instruction for all programmes of studies offered in the University shall be English unless otherwise specified in the Scheme and Syllabi of Examinations of the concerned programme of study.
- 4.22 If it is found at any stage during the entire period of the programme that the candidate has furnished any false or incorrect information in the application form or at the time of counselling/admission, his/her candidature for the programme will be cancelled summarily. In addition, disciplinary action may be taken against him/her as per the University rules.
- 4.23 If the University is not satisfied with the character, past behaviour or antecedents of a candidate, it can refuse to admit him/her to any course of study of the University.
- 4.24 The Vice Chancellor may cancel the admission of any student for specific reasons and debar him/her for a certain period.
- 4.25 It will also be the sole responsibility of the candidates themselves to make sure that they are eligible and fulfil all the conditions prescribed for admission.

4.26 The Merit based on marks at graduation-level followed by Personal Interview will be valid only for the programme for which the candidate has appeared and cannot be utilized for admission to any other programme. Further, the merit shall be valid only for the academic session 2026-27. No waiting list of candidates shall be prepared by any University Schools of Study.

4.27 RAGGING: Rules in terms of ordinance relating to maintenance of discipline amongst students of the University are as under:

- i Ragging in any form shall be strictly prohibited within the premises of the University, a college or an Institute, as the case may be, or in any part of the University system as well as on public transport, or at any other place, public or private.
- ii Any individual or collective act or practice of ragging shall constitute an act of gross indiscipline and shall be dealt with under the provisions of ordinance under reference.
- iii Ragging, for the purposes of ordinance under reference, shall ordinarily mean act, conduct or practice by which the dominant power or status of senior students is brought to bear upon the students who are in any way considered junior or inferior by the former and includes individual or collective acts or practices which:

Involve physical assault or threat to use physical force.

- Violate the status, dignity and honour of students, in particular female students and those belonging to a schedule caste or a schedule tribe.
- Expose students to ridicule or contempt or commit an act which may lower their self-esteem; and
- Entail verbal abuse, mental or physical torture, aggression, corporal punishment, harassment, trauma, indecent gesture and obscene behaviour.

- iv Anti Ragging - undertaking (Academic Session 2026-27)

In pursuance of UGC DO letter No. F.1-15/2009 (ARC) Pt. III dated 14th December, 2023, it is compulsory for each student and every parent to submit an online undertaking every academic year at www.antiragging.in. After registration, the candidates will receive an email with his/her registration number and then candidate will forward that e-mail to the Nodal Officer in the University/College at the time of reporting in the USSs/ affiliated Institute/ College.

It is again reiterated that it is compulsory/mandatory for each student to submit an online undertaking at www.antiragging.in. Subsequently, an Anti Ragging Undertaking Reference Number is generated by the UGC which is required to be filled by the candidates in the online application form.

NOTE:

IT IS ONCE AGAIN RETIERATED FOR THE BENEFIT OF ALL THE STAKEHOLDERS THAT RAGGING IS A CRIMINAL OFFENCE AND THE CULPRITS WILL ATTRACT PUNITIVE ACTION AS MENTIONED IN THE SAID UGC REGULATIONS.

- 4.28 The various terms and conditions mentioned in the Admission Brochure are subject to change made in the ordinances, rules and regulations by the University from time to time as per the decision of University and/or statutory bodies governing various programmes.
- 4.29 Admission schedule will be available online or through e-mail, on or before 3 days of the date of the admission.
- 4.30 Candidate must preserve a copy of application form till the admission procedure is over as it has to be handed over to the Admission Officer at the time of counselling/admission.
- 4.31 No claim of having filled up the Application Form and non-receipt admission schedule will be admissible after the admission process is over.
- 4.32 Impersonation is a punishable offence. The candidate's identity will be verified in respect of his/her details on the application form. If the identity is doubtful, the candidate may not be allowed to appear for interview. The authorities may permit the candidates to appear for interview/admission after completing the necessary formalities (visible mark of identification) at their discretion. No extra time will be allowed for these formalities to be completed. Police action will be initiated in case of dubious identity.
- 4.33 In case of non-receipt of admission schedule/non-reflecting of candidate name in merit list, the candidate may contact: **D 001, University School of Automation and Robotics, GGSIP University, Surajmal Vihar, East Campus, Delhi 110032** at least 2 days before the scheduled commencement of counselling. The application in this regard must be supported by a copy of the printed version of the application form and proof of payment of requisite fee. Without the submission of these two documents, no application in regard shall be entertained, the application in this regard shall be deemed incomplete and rejected without intimation to the applicant.

4. Important Dates:

S. No.	Description	Tentative Date(s)
1.	Start date for receipt of application (Online mode) (Online Registration followed by Submission of Online Application Form along with payment of Registration Fee of Rs. 2500/- plus taxes/ service charges as applicable.	17.08.2026
2.	Last date for receipt of application (Online mode)	31.08.2026
*Subject to change (Candidates are advised to keep themselves updated with notifications on the University website)		

5. Submission of Application Form:

- All the candidates have to apply online for admission to programme by filling up the online application form as available on University websites of GGSIPU (<http://www.ipu.ac.in>) and AGH University of Krakow (<https://www.international.agh.edu.pl/en>).
 - All the applicants need to download application form after filling up. The candidates are advised to take and retain a printout of the duly filled in application form.
- vi. The link for filling up the online application is as follows:
<https://forms.gle/98wmT4bPJFew1R3a8>

6. Instructions for filling up Application Form:

The candidates must read all the important instructions before filling up the Application Form.

- a. A detailed procedure for filling up the application form is available on University websites.
- b. The candidate should enter his or her relevant details and upload a recent clear photograph of size as mentioned with his or her scanned signature and left thumb impression.
- c. Relevant course should be chosen and payment of requisite application fee as notified must be made online.

7. Fee for the Programme:

If the admission application of the student to the dual-degree is successful, the fee towards the AGH University of Krakow, shall be funded by NAWA. In the second year of the programme, the student shall be required to pay the following fee. The fee has to be paid in two installments-Rs 1,00,000/- at the time of admission to the program and remaining Rs 1,09,500/- at the time of start of 3rd Semester of the Program.

Sl. No.	Fee Head	Amount (INR)
1	Tuition Fee (Per Annum)	1,76,000
2	University's Charges (Per Annum)	20,000
3	Alumni Contribution Fund (One Time Non – refundable)	0
4	Examination Fee (Per Annum) *	3,000
5	Innovation and Incubation Fee (Per Annum)*	500
6	Development and Infrastructural Charges	10,000
	Total	2,09,500*

* The student shall cover the costs of travel to the AGH University of Krakow, Poland, living expenses, insurance costs, and other costs related to studies. The accommodation in Krakow

for the duration of the first and second semester may be provided by the AGH University of Krakow, Poland.

Hard copy of the duly filled in Google form along with registration fee of Rs 2500/- in form of Demand Draft in favour of Registrar, Guru Gobind Singh Indraprastha University payable at Delhi has to be submitted in the O/o Dean, USAR GGSIP University by Monday, 31st August 2026.

8. Refund Policy:

- i. If the programme is not able to start due to any unforeseen circumstances, the full fee shall be refunded to the candidate.
- ii. If the student is not able to :-
 - (a) Secure VISA from Embassy of Poland
 - (b) Secure the Polish National Agency for Academic Exchange Scholarship (<https://nawa.gov.pl/en>) of the Ministry of Science and Higher Education (MNiSW), Govt of Poland or
 - (c) Secure Medical Clearance from Health Authorities of Poland
 - (d) Any other administrative and/or technical reason

till the start date of the course in the first week of October, he would be entitled to full refund of the fees.

- iii. If the student opt to withdraw then following fee refund policy is applicable as per the University Grants Commission Notification dt. 12.06.2024.

Category	Percentage of Refund of fees	Point of time when notice of withdrawal of admission is received in the HEI
1	100%	15 days or more before the formally notified last date of admission
2	90%	Less than 15 days before the formally notified last date of admission
3	80%	15 days or less after the formally notified last date of admission
4	50%	30 days or less, but more than 15 days after formally notified last date of admission
5	00%	More than 30 days after formally notified last date of admission

Note: The relevant date for request of cancellation & refund of fee shall be that of the date on which the said request has been received from the applicant in the office of Dean of the School/Director of the Centre.

9. **Mode of Programme**

Regular

10. **Seats**

Minimum:15

Maximum:48

PROPOSED TIME LINE TABLE FOR ADMISSION

S.No	ACTIVITY	LAST DATE
1	Uploading of the Admission brochure on University Website	Monday, 17th August 2026.
2	Last date to apply	Monday 31st August 2026
3	Display of Merit List of Students	Thursday 3rd September 2026
4	Interview/Personal Interaction session with Students from Merit List	Thursday, 10th September 2026
5	Display of Final Merit List + Waiting List of Selected Candidates on Website	Tuesday, 15th September 2026
6	Fee submission date	Monday, 28th September 2026
7	Submission of selected list of students to AGH University of Krakow	Thursday 1st October 2026
8	Form Filling and Submission of Documents for NAWA(National Agency for Academic Exchange) Scholarship of the Ministry of Science and Higher Education (MNiSW), Govt of Poland	Monday 5th October 2026 – Friday 9th October 2026
9	Course Start Date in AGH University of Krakow	February 2027



Study programme

Direction: Digital Production for Sustainable Manufacturing

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Characteristics of the direction

Basic information

Faculty name:	Faculty of Management
Name of the direction:	Digital Production for Sustainable Manufacturing
Level:	Master's degree in engineering studies, second cycle
Profile:	General academic
Form:	Stationary
ISCED classification:	0413
Number of ECTS points necessary to complete studies at a given level:	90
Professional title awarded to graduates:	Master of Science
Cycle start date:	2024/2025, summer semester
Duration of studies (number of semesters):	3

Field(s) of science to which the field of study is assigned:

A field of social science

The field of engineering and technical sciences

Scientific discipline(s) to which the field of study is assigned:

Discipline	Percentage	ECTS
Management and quality sciences	80%	72
Mechanical engineering	20%	18

Indicating the connection of the field of study with the AGH development strategy and the AGH mission

The master's program "Digital Production for Sustainable Manufacturing" focuses on the sustainable design and development of digital production systems, using advanced "clean" technologies, in order to deliver the so-called "green" products. Students acquire skills in designing new and transforming existing production systems, using digitization and automation of processes and reducing resource and energy consumption, focusing on the assumptions of the circular economy.

The studies respond to the new challenges of an economy based on artificial intelligence and circularity, while respecting the principles of environmental protection. Their goal is to understand:

- interrelationships between sustainable production factors and the effects of their impact on the economy, the impact
- of the use of new and clean production techniques on the environment,
- the essence of digitization and process automation in the context of reducing production costs,
- the relationship between local management activities and global supply chains,
- the relationship between the technologies used and eco-efficiency and eco-efficiency of production.

The studies are aimed at preparing students:

- to work in an international business environment, to
- develop key managerial competences,
- to independently deepen knowledge in the area of advanced solutions in the context of production management, to
- implement ecological and innovative ventures/projects,
- to design green products, implement
- clean production assumptions,

- using digital technologies to monitor, analyze, simulate and improve production processes and systems.

The Faculty's close relationship with the latest technologies and an active research and industrial environment will ensure appropriate education. In specialized laboratories, the student will become familiar with the latest technologies, such as 3D printing, VR (virtual reality), IIoT (Internet of Things), AI (artificial intelligence), using many advanced simulation and optimization programs and specialized laboratories.

The study program covers engineering and management aspects of production and indicates their interconnection. The engineering part is related to, among others, clean production technologies, automation and product development tools and methods. The management part includes operational strategy, resource management for the needs of a sustainable production environment and elements of management in the global economy. The program constructed in this way provides up-to-date knowledge in the field of:

- ecological production strategies,
- building reconfigurable and agile production systems, digital and
- automated production solutions,
- production engineering,
- describing and modeling production processes,
- defining requirements for digital solutions and their integration with information systems.

Therefore, the field of study is consistent with the strategic goal: Modern education attractive to students and the environment at home and abroad, in particular it is consistent with the operational goals: adapting the study program offer to current needs and expectations, increasing the attractiveness of second-cycle studies, strengthening the position of AGH in international educational space.

Information on the inclusion of socio-economic needs in the study program and the compliance of the assumed learning outcomes with these needs

The Faculty of Management identified socio-economic needs and included them in the study program. The Faculty also relied on available studies and analyzes of professions and competences of the future (Future Report 2024, Skills 20230, Forbes – professions of the future, Deloitte – the future of work is here, Report on empirical research in the field of competences and professions of the future), which show that digital solutions, artificial intelligence, cybersecurity, process automation, sustainable environment are the areas where they will be needed educated staff in the near future.

In the field of education in the field of Digital Production for Sustainable Manufacturing, the Faculty regularly consults the learning outcomes with employers and the socio-economic environment. The Faculty has an efficient Alumni Club Association (KA), which, among other things, conducts activities for the development of contacts between the Faculty's graduates and the integration of the scientific environment with employers and students of the Faculty. The association is a platform combining business with science. It brings together people from science, business and business-related institutions, as well as representatives of local government. It allows you to develop appropriate directions and learning outcomes consistent with the latest, not only current, but above all - future expectations and requirements of the labor market.

Educational paths - scope in Polish and English

not applicable

Diploma paths - scope in Polish and English

Not applicable.

Names of specialties in Polish and English

Name [pl]	Name [en]
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General information about the study program

Direction: Digital Production for Sustainable Manufacturing

General information related to the study program (general educational goals and employment opportunities, typical jobs and opportunities for graduates to continue their education)

Digital Production for Sustainable Manufacturing is a field of study in which the education lasts three semesters, ending with obtaining a master's degree in engineering, during which in-depth knowledge is provided and advanced skills in its use in conditions of environmental variability are developed.

The graduate of the new field of study will be fluent in issues related to the design, planning and organization of main and accompanying (auxiliary) production processes, starting from the digital design of products, processes and production systems, ending with settlement, control and process improvement. The graduate will also be prepared to design/develop new generation production plants for global manufacturing companies.

After graduating, the graduate will be able to take up employment in manufacturing companies in managerial and engineering positions focused on the use of advanced, intelligent production systems and will be prepared to perform tasks related to the design and development of systems, planning and control of digital production, designing green products and reducing the negative impact production on the environment.

Information on including conclusions from the analysis of the results of monitoring the professional careers of students and graduates in the study program

The study program of Digital Production for Sustainable Manufacturing will be subject to constant monitoring and will take into account the needs of the labor market, using the opinion of students and employers. Graduates of the Faculty of Management at AGH are covered by the so-called AGH Professional Staff Monitoring program (AGH Career Center), which has been continuously monitoring the professional careers of the Faculty's graduates since 2008, and its results are analyzed in terms of modifying existing learning outcomes. Graduates complete detailed surveys, answering several dozen questions, including assessing their studies and indicating current employment prospects. These studies are used during the annual faculty self-assessment of the quality of education and play an important role in creating and modifying study programs.

Information on the inclusion of the requirements and recommendations of accreditation committees in the study program, in particular the Polish Accreditation Committee and environmental accreditation committees

The Digital Production for Sustainable Manufacturing direction has not yet been assessed by PKA. However, drawing on the experience that the Faculty has in the field of assessments carried out by the Polish Academy of Sciences in other fields, the comments and recommendations have been implemented in the developed program for this field. For this purpose, the study program will be subject to systematic audit by the University Teaching Audit Team (UZAD).

As in other fields of study, the procedure for introducing changes to study programs will be followed by submitting applications by interested parties, verification and opinions by the Council for the field of study and acceptance by the Dean. As part of it, a person will be appointed to act as a course supervisor. Her task will be to cooperate with students in proposing changes in the methods of conducting classes and assessing students. In order to monitor and continually improve the quality of education in the proposed field of study, the results of employee evaluation surveys and the study program will be used.

Information on including examples of good practice in the study program

The Faculty cooperates with other foreign universities, e.g. by implementing the Professor from Abroad program, Erasmus+, teaching internships, exchanging and sharing knowledge in the field of education programs. This cooperation allows for the accumulation of good practices. This cooperation provides the opportunity to exchange knowledge and experiences regarding the needs of students and the European labor market, which are taken into account in education programs and exchange programs between universities in Europe, e.g. Italy, Spain, and around the world, e.g. Turkey or India. Similar cooperation occurs in

the area of the international labor market, where the Faculty of Management cooperates with global manufacturing companies, e.g. Danieli SPA, Maspex, DGM Mori, thereby identifying the needs of employers in terms of educating future staff. Good practices developed in this way help prepare graduates of this field to work on international markets.

Information on cooperation in the preparation of the study program with external stakeholders, in particular professional and social associations and organizations

Strategic decisions for the field and the Faculty are made taking into account two groups of stakeholders:

1. internal, forming a group of Faculty employees and students.
2. external, forming a group of international institutions, the international industry and trade sector, including cooperation with institutions, universities and enterprises from abroad, and civil society. The Faculty remains in contact with the socio-economic environment, conducting regular meetings with entrepreneurs and the Faculty Committees appointed for this purpose.

Dimension, rules and form of professional internships

Not applicable.

Recruitment conditions for studies

Direction: Digital Production for Sustainable Manufacturing

Description of competencies expected from a candidate applying for admission to studies

A candidate applying for admission to second-cycle studies in Digital Production for Sustainable Manufacturing at the Faculty of Management of AGH should have knowledge and skills adequate to the learning outcomes of the first-cycle studies in Management and Production Engineering as well as the ability to perform tasks and solve problems relevant to the continuous learning process. related to the field of study. The candidate should know at least English. at the B2 level and also demonstrate the ability to think independently and creatively use their skills.

Recruitment conditions, including winners and finalists of central level olympiads, as well as winners of international and national competitions

In accordance with the recruitment conditions specified for a given academic year by the Resolution of the AGH Senate, the basis for qualification is the recruitment index calculated on the basis of the number of points obtained in the entrance examination confirming the achievement of selected educational outcomes achieved in the first cycle of a given field of study and the average grade from first-cycle or long-cycle studies. Master's studies. For AGH graduates, if they continue their studies, it is possible to recognize the result of the general examination in the first-cycle studies as the result of the entrance examination.

Recruitment Rules:

Recruitment is conducted in accordance with the principles specified in the Resolution of the AGH University of Science and Technology Senate in force for a given academic year regarding the conditions, procedure and date of starting and ending recruitment for the first year of first-cycle and second-cycle studies.

(more details - <https://kandydaci.agh.edu.pl>)

The expected limit of admissions to studies, along with an indication of the minimum number of admitted people required to start the edition of studies

Minimum number of students: 12

Maximum number of students: 48

Learning outcomes

Direction: Digital Production for Sustainable Manufacturing

Knowledge

KEU symbol	Directional learning outcomes	CEU symbol
DPSM2A_W01	Knows and understands in-depth the principles of continuous and sustainable organizational development.	P7S_WK_A
DPSM2A_W02	Knows and understands in-depth issues related to digital design, planning and manufacturing of products in a sustainable and ecological way in response to market demand.	P7S_WG_A_Inz, P7S_WG_A
DPSM2A_W03	Knows and understands in-depth the needs and requirements for the design and operation of digital, sustainable and energy-efficient production processes and systems.	P7S_WG_A
DPSM2A_W04	Knows and understands in-depth methods, tools and theories regarding phenomena and processes of designing, planning and organizing digital reality.	P7S_WK_A
DPSM2A_W05	Knows and understands in-depth trends, concepts and decision-making dilemmas in management in connection with aspects of sustainable development.	P7S_WK_A_Inz, P7S_WK_A
DPSM2A_W06	Knows and understands in-depth concepts, principles and methods of managing production processes and systems, including their design, modeling and optimization.	P7S_WG_A
DPSM2A_W07	Knows and understands in-depth the functioning of modern management systems, intelligent and eco-efficient solutions supporting production management.	P7S_WG_A
DPSM2A_W08	Knows and understands in-depth methods, techniques, technologies and tools used to solve complex engineering problems.	P7S_WG_A

Skills

KEU symbol	Directional learning outcomes	CEU symbol
DPSM2A_U01	Is able to assess the environmental, economic and social consequences of his decisions in corporate and global contexts, including complex and unusual problems.	P7S_UW_A
DPSM2A_U02	Is able to characterize, compare and discuss sustainable practices and innovative initiatives in production management, including designing and assessing their impact on the environment.	P7S_UW_A_Inz_0 2, P7S_UW_A
DPSM2A_U03	Is able to apply modern concepts, methods (including digital methods), techniques and tools in engineering practice to solve complex and unusual problems, taking into account non-technical aspects	P7S_UW_A_Inz_0 2, P7S_UW_A
DPSM2A_U04	Able to plan and conduct experiments, identify, collect and interpret required data, and use judgment and creativity to work with complex and unpredictable tasks.	P7S_UW_A_Inz_0 1, P7S_UW_A
DPSM2A_U05	Is able to determine the directions of further scientific development and consciously undertake the process of self-education.	P7S_UU_A
DPSM2A_U06	Able to work both individually and in a team, able to manage an interdisciplinary team	P7S_UO_A
DPSM2A_U07	Is able to perform tasks in conditions of uncertainty, selecting and using appropriate methods and tools, including advanced digital technologies.	P7S_UW_A

KEU symbol	Directional learning outcomes	CEU symbol
DPSM2A_U08	Is able to communicate freely in an international and interdisciplinary team at the B2+ level, using specialized terminology.	P7S_UK_A

Social competence

KEU symbol	Directional learning outcomes	CEU symbol
DPSM2A_K01	Is ready to critically evaluate his own knowledge and information, supplement and improve the acquired knowledge and skills, independently search for solutions to theoretical and practical tasks while defining priorities for the implementation of assigned tasks.	P7S_KK_A
DPSM2A_K02	Is ready to fulfill social obligations, think and act in an entrepreneurial, innovative and socially responsible way, initiate and participate in the preparation of social projects, and assess the consequences of one's actions, including their impact on the environment.	P7S_KO_A
DPSM2A_K03	Is ready to fulfill social roles responsibly, taking into account changing social needs, including: developing professional achievements, maintaining the principles of professional ethics, observing and developing the principles of professional ethics and acting in accordance with these principles.	P7S_KR_A

Table of compatibility between engineering competencies (Inz) and field of study learning outcomes (KEU)

Direction: Digital Production for Sustainable Manufacturing

Knowledge

CEU symbol	Learning outcomes for qualifications covering engineering competencies	References to KEU
P7S_WG_A_Inz	The graduate knows and understands the basic processes occurring in the life cycle of devices, facilities and technical systems	DPSM2A_W02
P7S_WK_A_Inz	The graduate knows and understands the basic principles of creating and developing various forms of individual entrepreneurship	DPSM2A_W05

Skills

CEU symbol	Learning outcomes for qualifications covering engineering competencies	References to KEU
P7S_UW_A_Inz_01	The graduate is able to plan and conduct experiments, including measurements and computer simulations, interpret the obtained results and draw conclusions; when identifying and formulating specifications for engineering tasks and solving them: - use analytical, simulation and experimental methods, - recognize their systemic and non-technical aspects, including ethical aspects, - make a preliminary economic assessment of the proposed solutions and undertaken engineering activities; critically analyze how existing technical solutions work and evaluate these solutions	DPSM2A_U04
P7S_UW_A_Inz_02	The graduate is able to design - in accordance with a given specification - and produce simple devices, objects, systems typical for the field of study or implement processes, using appropriately selected methods, techniques, tools and materials.	DPSM2A_U02, DPSM2A_U03

with specific learning outcomes (KEU)

Directional effects coverage matrix

Direction: Digital Production for Sustainable Manufacturing

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Item	Code	Term	DPSM2A_W01	DPSM2A_W02	DPSM2A_W03	DPSM2A_W04	DPSM2A_W05	DPSM2A_W06	DPSM2A_W07	DPSM2A_W08	DPSM2A_U01	DPSM2A_U02	DPSM2A_U03	DPSM2A_U04	DPSM2A_U05	DPSM2A_U06	DPSM2A_U07	DPSM2A_U08	DPSM2A_K01	DPSM2A_K02	DPSM2A_K03
Sustainable Manufacturing in Circular Economy	ZRDPSMS.IIi1K.661e374a7e952.24	1s	x			x	x				x	x			x				x	x	
Competitive Sustainable Business	ZRDPSMS.IIi7S.4c7769b33a50a129c26d7e8277962e98.24	1s																			
		2s	x				x				x									x	
		or 3s																			
contemporary trends, challenges and concepts in digital technologies	ZRDPSMS.IIi7S.661e374b1460a.24	1s or 2s or 3s		x	x	x							x	x						x	
Digitalization in Smart and Cleaner Production	ZRDPSMS.IIi1K.661e374a8b303.24	1s					x		x		x		x	x						x	
Project management	ZRDPSMS.IIi1K.8a38ca14dfd6a4112fda620666db2f11.24	1s					x						x			x				x	
contemporary trends, challenges and concepts in economy and management	ZRDPSMS.IIi7S.65631eefb0dac.24	1s																			
		2s	x				x				x		x	x						x	x
		or 3s																			

Item	Code	Term	DPSM2A_W01	DPSM2A_W02	DPSM2A_W03	DPSM2A_W04	DPSM2A_W05	DPSM2A_W06	DPSM2A_W07	DPSM2A_W08	DPSM2A_U01	DPSM2A_U02	DPSM2A_U03	DPSM2A_U04	DPSM2A_U05	DPSM2A_U06	DPSM2A_U07	DPSM2A_U08	DPSM2A_K01	DPSM2A_K02	DPSM2A_U09
Eco-Innovation in Industry	ZRDPSMS.Ili7S.726bbcf8375ed4b0e4f52911391624f0.24	1s or 2s or 3s	x				x				x				x					x	x
Crossborder Management	ZRDPSMS.Ili1K.661e374aa4164.24	1s	x								x										x
Cybersecurity & Ai System Protection	ZRDPSMS.Ili1K.661e374aafab2.24	1s			x	x			x				x			x	x				x
International Transportation and Logistics Management	ZRDPSMS.Ili7S.65c13beb51b6b5a2454ee124dfa4b578.24	1s or 2s or 3s		x			x				x		x						x	x	x
Green & Clean Technologies in Manufacturing	ZRDPSMS.Ili1K.661e374abaff7.24	1s	x	x	x		x				x	x	x						x	x	
Sustainable Development in the EU	ZRDPSMS.Ili7S.df27d183e31f0ceb478725f74bba5110.24	1s or 2s or 3s	x								x							x		x	
Robotics and Mechatronic Systems	ZRDPSMS.Ili3S.661e374b399f9.24	1s or 2s		x	x								x	x						x	
Decision-Making in Circular Supply Chain	ZRDPSMS.Ili3S.6242cf60be444.24	1s or 2s					x	x						x		x		x	x		

Item	Code	Term	DPSM2A_W01	DPSM2A_W02	DPSM2A_W03	DPSM2A_W04	DPSM2A_W05	DPSM2A_W06	DPSM2A_W07	DPSM2A_W08	DPSM2A_U01	DPSM2A_U02	DPSM2A_U03	DPSM2A_U04	DPSM2A_U05	DPSM2A_U06	DPSM2A_U07	DPSM2A_U08	DPSM2A_K01	DPSM2A_K02	DPSM2A_K03
Combinatorial Optimization and Scheduling in Manufacturing and Services	ZRDPSMS.Ili3S.a5daa280fe78b2a8e42b7254ef1f113f.24	1s or 2s						X		X							X			X	
Modeling and Optimization in Transport Planning	ZRDPSMS.Ili3S.da99b40398910cb421ed4db1a6b0df6d.24	1s or 2s						X						X		X		X	X		
Sustainable Energy Systems	ZRDPSMS.Ili3S.661e374b79d9d.24	1s or 2s	X	X	X			X	X	X		X	X			X			X	X	
Additive methods in rapid prototyping	ZRDPSMS.Ili3S.662650499928a.24	1s or 2s		X	X	X	X	X	X	X		X	X	X			X		X	X	X
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b95918269.24	1s																X			
French B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b95923fe1.24	1s																X			
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b9592fa42.24	1s																X			
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b9593b5e9.24	1s																X			

Item	Code	Term	DPSM2A_W01	DPSM2A_W02	DPSM2A_W03	DPSM2A_W04	DPSM2A_W05	DPSM2A_W06	DPSM2A_W07	DPSM2A_W08	DPSM2A_U01	DPSM2A_U02	DPSM2A_U03	DPSM2A_U04	DPSM2A_U05	DPSM2A_U06	DPSM2A_U07	DPSM2A_U08	DPSM2A_K01	DPSM2A_K02	DPSM2A_K03
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b959473e1.24	1s																X			
Business Simulation	ZRDPSMS.Ili2K.661e374c19a31.24	2s					X		X		X										
Digital Plant and Buildings Simulation	ZRDPSMS.Ili2K.661e374bea1a3.24	2s	X	X	X				X	X		X	X	X			X	X		X	
Green Product Design	ZRDPSMS.Ili2K.661e374bd362e.24	2s		X		X	X	X		X	X		X	X						X	
Industrial Eco-Efficiency	ZRDPSMS.Ili2K.661e374c0e69a.24	2s	X	X							X	X								X	
Modeling and Process Optimization	ZRDPSMS.Ili2K.661e374bdebe0.24	2s	X				X				X			X				X	X		
Research Methods in Management	ZRDPSMS.Ili2P.b8dadd94be64c8b6713c09aa120fbdd8.24	2s						X	X	X			X	X					X	X	
Diploma Thesis	ZRDPSMS.Ili4K.e53bc1ffec52171870fc55d1cec2fa6a.24	3s				X	X								X		X		X		
Diploma Seminar	ZRDPSMS.Ili4K.113e607328fe3b1feac36d5c37a13bcd.24	3s								X	X		X			X			X		
Total (mandatory):			6	4	3	4	8	2	5	4	9	4	8	5	2	3	3	2	6	8	2
Total (optional):			5	5	4	2	6	5	2	3	5	2	6	6	1	3	2	8	5	10	4
Sum:			11	9	7	6	14	7	7	7	14	6	14	11	3	6	5	10	11	18	6

Matrix of characteristics of learning outcomes in relation to course modules

Direction: Digital Production for Sustainable Manufacturing

2024/2025/S/III/Z/DPSM/all

Item	Code	Term	P7S_WK_A	P7S_WG_A_Inz	P7S_WG_A	P7S_WK_A_Inz	P7S_UW_A	P7S_UW_A_Inz_02	P7S_UW_A_Inz_01	P7S_UU_A	P7S_UO_A	P7S_UK_A	P7S_KK_A	P7S_KO_A	P7S_KR_A
Sustainable Manufacturing in Circular Economy	ZRDPSMS.IIi1K.661e374a7e952.24	1s	x			x	x	x		x			x	x	
Competitive Sustainable Business	ZRDPSMS.IIi7S.4c7769b33a50a129c26d7e8277962e98.24	1s or 2s or 3s	x			x	x							x	
Contemporary trends, challenges and concepts in digital technologies	ZRDPSMS.IIi7S.661e374b1460a.24	1s or 2s or 3s	x	x	x		x	x	x					x	
Digitalization in Smart and Cleaner Production	ZRDPSMS.IIi1K.661e374a8b303.24	1s	x		x	x	x	x	x					x	
Project management	ZRDPSMS.IIi1K.8a38ca14dfd6a4112fda620666db2f11.24	1s	x			x	x	x			x			x	
Contemporary trends, challenges and concepts in economy and management	ZRDPSMS.IIi7S.65631eefb0dac.24	1s or 2s or 3s	x			x	x	x	x					x	x
Eco-Innovation in Industry	ZRDPSMS.IIi7S.726bbcf8375ed4b0e4f52911391624f0.24	1s or 2s or 3s	x			x	x			x				x	x
Crossborder Management	ZRDPSMS.IIi1K.661e374aa4164.24	1s	x				x								x
Cybersecurity & Ai System Protection	ZRDPSMS.IIi1K.661e374aafab2.24	1s	x		x		x	x			x				x
International Transportation and Logistics Management	ZRDPSMS.IIi7S.65c13beb51b6b5a2454ee124dfa4b578.24	1s or 2s or 3s	x	x	x	x	x	x					x	x	x
Green & Clean Technologies in Manufacturing	ZRDPSMS.IIi1K.661e374abaff7.24	1s	x	x	x	x	x	x					x	x	

Item	Code	Term	P7S_WK_A	P7S_WG_A_Inz	P7S_WG_A	P7S_WK_A_Inz	P7S_UW_A	P7S_UW_A_Inz_02	P7S_UW_A_Inz_01	P7S_UU_A	P7S_UO_A	P7S_UK_A	P7S_KK_A	P7S_KO_A	P7S_KR_A
Sustainable Development in the EU	ZRDPSMS.Ili7S.df27d183e31f0ceb478725f74bba5110.24	1s or 2s or 3s	x				x				x			x	
Robotics and Mechatronic Systems	ZRDPSMS.Ili3S.661e374b399f9.24	1s or 2s		x	x		x	x	x					x	
Decision-Making in Circular Supply Chain	ZRDPSMS.Ili3S.6242cf60be444.24	1s or 2s	x		x	x	x		x		x	x	x		
Combinatorial Optimization and Scheduling in Manufacturing and Services	ZRDPSMS.Ili3S.a5daa280fe78b2a8e42b7254ef1f113f.24	1s or 2s			x		x							x	
Modeling and Optimization in Transport Planning	ZRDPSMS.Ili3S.da99b40398910cb421ed4db1a6b0df6d.24	1s or 2s			x		x		x		x	x	x		
Sustainable Energy Systems	ZRDPSMS.Ili3S.661e374b79d9d.24	1s or 2s	x	x	x		x	x			x		x	x	
Additive methods in rapid prototyping	ZRDPSMS.Ili3S.662650499928a.24	1s or 2s	x	x	x	x	x	x	x				x	x	x
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b95918269.24	1s										x			
French B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b95923fe1.24	1s										x			
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b9592fa42.24	1s										x			
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b9593b5e9.24	1s										x			
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	ZRDPSMS.Ili1JO.6565b959473e1.24	1s										x			
Business Simulation	ZRDPSMS.Ili2K.661e374c19a31.24	2s	x		x	x	x								
Digital Plant and Buildings Simulation	ZRDPSMS.Ili2K.661e374bea1a3.24	2s	x	x	x		x	x	x			x		x	

Item	Code	Term	P7S_WK_A	P7S_WG_A_Inz	P7S_WG_A	P7S_WK_A_Inz	P7S_UW_A	P7S_UW_A_Inz_02	P7S_UW_A_Inz_01	P7S_UU_A	P7S_UO_A	P7S_UK_A	P7S_KK_A	P7S_KO_A	P7S_KR_A
Green Product Design	ZRDPSMS.IIi2K.661e374bd362e.24	2s	x	x	x	x	x	x	x					x	
Industrial Eco-Efficiency	ZRDPSMS.IIi2K.661e374c0e69a.24	2s	x	x	x		x	x						x	
Modeling and Process Optimization	ZRDPSMS.IIi2K.661e374bdebe0.24	2s	x			x	x		x		x	x			
Research Methods in Management	ZRDPSMS.IIi2P.b8dadd94be64c8b6713c09aa120fbbd8.24	2s			x		x	x	x			x	x		
Diploma Thesis	ZRDPSMS.IIi4K.e53bc1ffec52171870fc55d1cec2fa6a.24	3s	x			x	x			x		x			
Diploma Seminar	ZRDPSMS.IIi4K.113e607328fe3b1feac36d5c37a13bcd.24	3s			x		x	x		x		x			
Total (mandatory):			12	4	9	8	14	10	5	2	3	2	6	8	2
Total (optional):			9	5	8	6	12	6	6	1	3	8	5	10	4
Sum:			21	9	17	14	26	16	11	3	6	10	11	18	6

Matrix of directional learning outcomes in relation to the forms of classes and the method of assessment that allow them to be obtained

Direction: Digital Production for Sustainable Manufacturing

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Name of the class module	Form of teaching classes	A method of verifying and assessing the learning outcomes achieved by the student within individual forms of classes and for the entire course module	References to KEU
Sustainable Manufacturing in Circular Economy	Lecture, Design exercises	Participation in the discussion, Exam, Class activity, Project, Presentation	DPSM2A_W01, DPSM2A_W05, DPSM2A_W04, DPSM2A_U01, DPSM2A_U02, DPSM2A_U05, DPSM2A_K01, DPSM2A_K02
Competitive Sustainable Business	Lecture, auditorium exercises	Colloquium, Project, Case studies, Presentation	DPSM2A_W05, DPSM2A_W01, DPSM2A_U01, DPSM2A_K02
Contemporary trends, challenges and concepts in digital technologies	Lecture, auditorium exercises	Colloquium, Project	DPSM2A_W02, DPSM2A_W04, DPSM2A_W03, DPSM2A_U03, DPSM2A_U04, DPSM2A_K02
Digitalization in Smart and Cleaner Production	Lecture, Design exercises, Laboratory exercises	Exam, colloquium, project	DPSM2A_W05, DPSM2A_W07, DPSM2A_U03, DPSM2A_U01, DPSM2A_U04, DPSM2A_K02
Project management	Lecture, Design exercises	Colloquium, Project	DPSM2A_W05, DPSM2A_U06, DPSM2A_U03, DPSM2A_K02
Contemporary trends, challenges and concepts in economy and management	Lecture, auditorium exercises	Colloquium, Project	DPSM2A_W05, DPSM2A_W01, DPSM2A_U01, DPSM2A_U03, DPSM2A_U04, DPSM2A_K03, DPSM2A_K02
Eco-Innovation in Industry	Lecture, auditorium exercises	Activity in classes, Case studies, Final test results, Project implementation, Presentation	result, Oral answer
Crossborder Management	Lecture, auditorium exercises	Activity in classes, Colloquium, Exam, Case studies, Involvement in team work, Presentation, Final test	

Matrix of directional learning outcomes in relation to the forms of classes and the method of assessment that allow them to be obtained

DPSM2A_W01, DPSM2A_W05, DPSM2A_U01, DPSM2A_U05, DPSM2A_K02,
DPSM2A_K03

DPSM2A_W01, DPSM2A_U01, DPSM2A_K03

Name of the class module	Form of teaching classes	A method of verifying and assessing the learning outcomes achieved by the student within individual forms of classes and for the entire course module	References to KEU
Cybersecurity & Ai System Protection	Lecture, Design exercises, Laboratory exercises	Colloquium, Project, Laboratory assessment	DPSM2A_W03, DPSM2A_W04, DPSM2A_W07, DPSM2A_U03, DPSM2A_U06, DPSM2A_U07, DPSM2A_K03
International Transportation and Logistics Management	Lecture, auditorium exercises	Result of the final test, performance of exercises, presentation	DPSM2A_W02, DPSM2A_W05, DPSM2A_U01, DPSM2A_U03, DPSM2A_K01, DPSM2A_K02, DPSM2A_K03
Green & Clean Technologies in Manufacturing	Lecture, Design exercises	Colloquium, Project, Presentation	DPSM2A_W01, DPSM2A_W03, DPSM2A_W05, DPSM2A_W02, DPSM2A_U01, DPSM2A_U02, DPSM2A_U03, DPSM2A_K01, DPSM2A_K02
Sustainable Development in the EU	Lecture, auditorium exercises	Activity in classes, Participation in discussions, Essay, Essays written during classes, Presentation	DPSM2A_W01, DPSM2A_U01, DPSM2A_U08, DPSM2A_K02
Robotics and Mechatronic Systems	Lecture, Design exercises	Final test result, report	DPSM2A_W02, DPSM2A_W03, DPSM2A_U03, DPSM2A_U04, DPSM2A_K02
Decision-Making in Circular Supply Chain	Lecture, Design exercises	Colloquium, Participation in the discussion, Exercises, Project implementation, Case studies, Involvement in team work, Presentation	DPSM2A_W05, DPSM2A_W06, DPSM2A_U04, DPSM2A_U06, DPSM2A_U08, DPSM2A_K01
Combinatorial Optimization and Scheduling in Manufacturing and Services	Lecture, Design exercises	Colloquium, Class activity, Exercises, Project, Case studies, Presentation	DPSM2A_W06, DPSM2A_W08, DPSM2A_U07, DPSM2A_K02
Modeling and Optimization in Transport Planning	Lecture, Design exercises	Colloquium, Participation in the discussion, Exercises, Project implementation, Case studies, Involvement in team work, Presentation	DPSM2A_W06, DPSM2A_U04, DPSM2A_U06, DPSM2A_U08, DPSM2A_K01
Sustainable Energy Systems	Lecture, Design exercises	Colloquium, Project, Presentation	DPSM2A_W01, DPSM2A_W03, DPSM2A_W06, DPSM2A_W08, DPSM2A_W02, DPSM2A_W07, DPSM2A_U03, DPSM2A_U02, DPSM2A_U06, DPSM2A_K01, DPSM2A_K02

Name of the class module	Form of teaching classes	A method of verifying and assessing the learning outcomes achieved by the student within individual forms of classes and for the entire course module	References to KEU
Additive methods in rapid prototyping	Lecture, exercises laboratory	Colloquium, Class activity, Project, Report, Laboratory assessment	DPSM2A_W02, DPSM2A_W03, DPSM2A_W04, DPSM2A_W08, DPSM2A_W05, DPSM2A_W06, DPSM2A_W07, DPSM2A_U02, DPSM2A_U03, DPSM2A_U04, DPSM2A_U07, DPSM2A_K01, DPSM 2A_K02, DPSM2A_K03
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship	Activity in classes, Participation in the discussion, Completion of exercises, Colloquium, Examination, Report, Paper, Final test result, Essays written during classes, Presentation	DPSM2A_U08
French B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship	Activity in classes, Participation in the discussion, Completion of exercises, Colloquium, Examination, Report, Paper, Final test result, Essays written during classes, Presentation	DPSM2A_U08
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship	Activity in classes, Participation in the discussion, Completion of exercises, Colloquium, Examination, Report, Paper, Final test result, Essays written during classes, Presentation	DPSM2A_U08
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship	Activity in classes, Participation in the discussion, Completion of exercises, Colloquium, Examination, Report, Paper, Final test result, Essays written during classes, Presentation	DPSM2A_U08
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship	Activity in classes, Participation in the discussion, Completion of exercises, Colloquium, Examination, Report, Paper, Final test result, Essays written during classes, Presentation	DPSM2A_U08
Business Simulation	Laboratory exercises	Report	DPSM2A_W05, DPSM2A_W07, DPSM2A_U01
Digital Plant and Buildings Simulation	Lecture, Design exercises, Laboratory exercises	Colloquium, Presentation, Project	DPSM2A_W01, DPSM2A_W02, DPSM2A_W03, DPSM2A_W07, DPSM2A_W08, DPSM2A_U02, DPSM2A_U03, DPSM2A_U04, DPSM2A_U07, DPSM2A_U08, DPSM2A_K02

Matrix of directional learning outcomes in relation to the forms of classes and the method of assessment that allow them to be obtained

Name of the class module	Form of teaching classes	A method of verifying and assessing the learning outcomes achieved by the student within individual forms of classes and for the entire course module	References to KEU
Green Product Design	Lecture, Design exercises, Laboratory exercises	Colloquium, Exam, Presentation, Project	DPSM2A_W02, DPSM2A_W04, DPSM2A_W05, DPSM2A_W06, DPSM2A_W08, DPSM2A_U01, DPSM2A_U03, DPSM2A_U04, DPSM2A_K02
Industrial Eco-Efficiency	Lecture, auditorium exercises	Colloquium, Participation in the discussion, Presentation	DPSM2A_W01, DPSM2A_W02, DPSM2A_U01, DPSM2A_U02, DPSM2A_K02
Modeling and Process Optimization	Lecture, Design exercises, Laboratory exercises	Exam, Class activity, Project, Case studies, Presentation, Performing laboratory exercises, Involvement in team work	DPSM2A_W01, DPSM2A_W05, DPSM2A_U01, DPSM2A_U08, DPSM2A_U04, DPSM2A_K01
Research Methods in Management	Lecture, Design exercises	Project, Colloquium	DPSM2A_W06, DPSM2A_W07, DPSM2A_W08, DPSM2A_U03, DPSM2A_U04, DPSM2A_K01, DPSM2A_K02
Diploma Thesis	thesis	Activity in classes, Participation in discussions, Diploma thesis	DPSM2A_W05, DPSM2A_W04, DPSM2A_U05, DPSM2A_U07, DPSM2A_K01
Diploma Seminar	Seminar classes	Activity in classes, Presentation	DPSM2A_W08, DPSM2A_U03, DPSM2A_U01, DPSM2A_U06, DPSM2A_K01

Study plans

Name of the field: Digital Production for Sustainable Manufacturing

Semester 1

Item	Number hours	Points ECTS	Form verification	
Sustainable Manufacturing in Circular Economy	Lecture: 30 Exercises design: thirty	5.0	Exam	ABOUT
Digitalization in Smart and Cleaner Production	Lecture: 30 Exercises laboratory : 15 Exercises design: 15	5.0	Exam	ABOUT
Project management	Lecture: 15 Exercises design: 15	2.0	Pass	ABOUT
Crossborder Management	Lecture: 15 Exercises auditorium: 15	2.0	Exam	ABOUT
Cybersecurity & Ai System Protection	Lecture: 15 Exercises laboratory : 15 Exercises design: 15	2.0	Pass	ABOUT
Green & Clean Technologies in Manufacturing	Lecture: 15 Exercises design: 15	2.0	Pass	ABOUT
Elective group 1		5.0	Pass	ABOUT
The student chooses one subject				
Competitive Sustainable Business	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Contemporary trends, challenges and concepts in digital technologies	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Contemporary trends, challenges and concepts in economy and management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN

Item	Number hours	Points ECTS	Form verification	
Eco-Innovation in Industry	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
International Transportation and Logistics Management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Sustainable Development in the EU	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Elective group 2		5.0	Pass	ABOUT
The student chooses one subject				
Robotics and Mechatronic Systems	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Decision-Making in Circular Supply Chain	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Combinatorial Optimization and Scheduling in Manufacturing and Services	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Modeling and Optimization in Transport Planning	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Sustainable Energy Systems	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Additive methods in rapid prototyping	Lecture: 30 Exercises laboratory : thirty	5.0	Pass	IN
Foreign language (group)		2.0	Exam	ABOUT
The student chooses one subject				
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship: 30	2.0	Exam	IN
French B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship: 30	2.0	Exam	IN
Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship: 30	2.0	Exam	IN
German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship: 30	2.0	Exam	IN

Item	Number hours	Points ECTS	Form verification	
Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Lectureship: 30	2.0	Exam	IN
Sum	405	30.0		

Semester 2

Item	Number hours	Points ECTS	Form verification	
Business Simulation	Exercises laboratory : 15	1.0	Pass	ABOUT
Digital Plant and Buildings Simulation	Lecture: 30 Exercises laboratory : 15 Exercises design: thirty	5.0	Pass	ABOUT
Green Product Design	Lecture: 30 Exercises laboratory : 15 Exercises design: 15	5.0	Exam	ABOUT
Industrial Eco-Efficiency	Lecture: 15 Exercises auditorium: 15	2.0	Exam	ABOUT
Modeling and Process Optimization	Lecture: 30 Exercises laboratory : 15 Exercises design: 15	2.0	Exam	ABOUT
Research Methods in Management	Lecture: 30 Exercises design: thirty	4.0	Pass	ABOUT
Elective group 1		5.0	Pass	ABOUT
The student chooses one subject				
Competitive Sustainable Business	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Contemporary trends, challenges and concepts in digital technologies	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN

Item	Number hours	Points ECTS	Form verification	
Contemporary trends, challenges and concepts in economy and management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Eco-Innovation in Industry	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
International Transportation and Logistics Management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Sustainable Development in the EU	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Elective group 2		5.0	Pass	ABOUT
The student chooses one subject				
Additive methods in rapid prototyping	Lecture: 30 Exercises laboratory : thirty	5.0	Pass	IN
Combinatorial Optimization and Scheduling in Manufacturing and Services	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Decision-Making in Circular Supply Chain	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Modeling and Optimization in Transport Planning	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Robotics and Mechatronic Systems	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Sustainable Energy Systems	Lecture: 30 Exercises design: thirty	5.0	Pass	IN
Sum	420	29.0		

Semester 3

Item	Number hours	Points ECTS	Form verification	
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Item	Number hours	Points ECTS	Form verification	
Elective group 1		5.0	Pass	ABOUT
The student chooses one subject				
Eco-Innovation in Industry	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
International Transportation and Logistics Management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Sustainable Development in the EU	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Contemporary trends, challenges and concepts in economy and management	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Contemporary trends, challenges and concepts in digital technologies	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
Competitive Sustainable Business	Lecture: 30 Exercises auditorium: thirty	5.0	Pass	IN
	Work			
Diploma Thesis	diploma: 0	20.0	Pass	ABOUT
Diploma Seminar	Classes seminar: 15	1.0	Pass	ABOUT
Humanites group		5.0	Pass	ABOUT
The student selects items from the UBPO HES offer with a total value of min. 5 ECTS				
Humanites group	Sum of hours contactc h: 60	5.0	Pass	IN
Sum	135	31.0		

O - Mandatory

W - To choose from

ECTS

Direction: Digital Production for Sustainable Manufacturing

The total number of ECTS points that a student must obtain in:

classes conducted with the direct participation of academic teachers or other persons conducting classes	46
classes in basic sciences appropriate for a given field of study	4
practical classes that develop practical skills, including laboratory, design, practical and workshop classes	36
classes to be selected by the student (not less than 30% of the number of ECTS points necessary to obtain qualifications corresponding to the level of education)	51
courses in the field of humanities or social sciences - in the case of fields of study assigned to disciplines within fields other than humanities or social sciences, respectively	5
foreign language classes	2
professional internships	0
classes related to the scientific activity conducted at the University in the discipline or disciplines to which the field of study is assigned, in an amount greater than 50% of the number of ECTS points required to complete studies at a given level, taking into account the participation of students in classes preparing for conducting scientific activity or participation in this activity (applies only to general academic studies)	60
classes developing practical skills in an amount exceeding 50% of the number of ECTS points required to complete studies at a given level (applies only to studies with a practical profile)	0

Syllabuses



Sustainable Manufacturing in Circular Economy

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPSMS.Ili1K.661e374a7e952.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Lectures: 30 Project classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	- Knows and understands deeply the principles of circular economy and sustainable manufacturing	DPSM2A_W01	Participation in a discussion, Examination
W2	- Knows and understands the methods, tools, and instruments for achieving circularity targets	DPSM2A_W05	Participation in a discussion, Examination
W3	- Identify the possibilities for introducing methods, tools, and theories across the entire value chain to achieve circularity targets, with a focus on digitization	DPSM2A_W04	Participation in a discussion, Examination

Skills – Student can:			
U1	- Can apply a perspective on planning and implementing projects and innovations from economic, environmental, and social viewpoints within the organization	DPSM2A_U01	Activity during classes, Participation in a discussion, Project, Presentation
U2	- Can present and prepare a project on sustainable manufacturing, considering circularity and decarbonization targets, while incorporating the entire value chain.	DPSM2A_U02	Activity during classes, Participation in a discussion, Project, Presentation
U3	- Can describe the trends and future scenarios for technology development, considering sustainability requirements	DPSM2A_U05	Activity during classes, Participation in a discussion, Project, Presentation
Social competences – Student is ready to:			
K1	- Have a holistic perspective on the current issues with the implementation of sustainable manufacturing, which can be practically implemented in both theoretical and practical aspects.	DPSM2A_K01	Activity during classes, Participation in a discussion, Project, Presentation
K2	- Willing to present his arguments and taking into account other points of view, - Understands the need for social education in the scope of the impact of economic decisions made on the natural environment,	DPSM2A_K02	Activity during classes, Participation in a discussion, Project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Preparation for classes	15
Realization of independently performed tasks	23
Preparation of project, presentation, essay, report	20
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

themodule

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The module presents issues in the field: • resources management, • waste management, • decarbonisation, • market based instrument for circular economy, • green claims • reporting
Project classes	U1, U2, U3, K1, K2	



Digitalization in Smart and Cleaner Production

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMS.IIi1K.661e374a8b303.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Obligations
Form of study Full-time studies	Block Core Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yeah

Period Semester 1	Method of verification of the learning outcomes Exam	Number of ECTS credits 5
	Activities and hours Lectures: 30 Project classes: 15 Laboratory classes: 15	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student knows modern tools used in digital and clean production and understands their significance for production management.	DPSM2A_W05, DPSM2A_W07	Examination
W2	The student knows and understands the impact of digitization on production activities, especially in the aspect of clean production technologies.	DPSM2A_W07	Examination

W3	The student knows and understands the importance of smart solutions in terms of efficiency and productivity in production systems.	DPSM2A_W07	Examination
Skills – Student can:			
U1	The student is able to describe digital solutions used in smart and clean production.	DPSM2A_U03	Test
U2	The student can identify the benefits of implementing digital manufacturing, smart factories and clean production.	DPSM2A_U01	Test
U3	The student can utilize the MPA strategy (Manufacturing Process Analysis) to formulate the premises of digital factories.	DPSM2A_U04	Test, Project
U4	The student can design a simple digital factory.	DPSM2A_U04	Project
Social competences – Student is ready to:			
K1	Student is able to evaluate the consequences of their decisions the environment aspect	DPSM2A_K02	Test

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	15
Laboratory classes	15
Preparation for classes	38
Examination or final test/colloquium	2
Preparation of project, presentation, essay, report	20
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
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Lectures	W1, W2, W3	Students familiarize themselves with digital components and solutions used to construct smart and clean systems.
Laboratory classes	U1, U2, U3, U4, K1	
Project classes	U1, U2, U3, U4, K1	



Project management

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi1K.8a38ca14dfd6a4112fda620666db2f11.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 15 Project classes: 15	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student understands a project's definition, characteristics, project life cycle, stages of project development, leadership styles, and project team specifics. The student knows how to evaluate investment projects.	DPSM2A_W05	Test
Skills – Student can:			

U1	Students can choose a project team, plan the project's course using selected methods, and evaluate the investment project's profitability.	DPSM2A_U06	Test
U2	Using the selected IT tool, the student can plan and monitor the project's course.	DPSM2A_U03	Project
Social competences – Student is ready to:			
K1	The student is ready to use IT tools to plan and monitor the project's course, assess the investment project's profitability, and select the project team.	DPSM2A_K02	Project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	15
Project classes	15
Contact hours	5
Examination or final test/colloquium	2
Preparation of project, presentation, essay, report	10
Preparation for classes	3
Student workload	Hours 50
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Project classes	U2, K1	The module presents issues in project planning and management methods and introduces the functions of IT tools for project planning and monitoring.
Lectures	W1, U1	



Crossborder Management

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi1K.661e374aa4164.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yes
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Lectures: 15 Auditorium classes: 15	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Knows the types and legal forms of enterprises	DPSM2A_W01	Test, Examination, Test results, Presentation, Oral answer
W2	Knows the types of environment	DPSM2A_W01	Test, Examination, Test results, Presentation, Oral answer

W3	Knows the types of strategies	DPSM2A_W01	Test, Examination, Test results, Presentation, Oral answer
W4	knows the internationalization strategies of companies	DPSM2A_W01	Test, Examination, Test results, Presentation, Oral answer
Skills – Student can:			
U1	Students are able to distinguish between the legal forms of enterprises	DPSM2A_U01	Activity during classes, Case study, Involvement in teamwork, Test results, Presentation, Oral answer
U2	Be able to analyze the environment and identify opportunities and threats	DPSM2A_U01	Activity during classes, Case study, Involvement in teamwork, Test results, Presentation, Oral answer
U3	Be able to design an internationalization strategy for a selected company	DPSM2A_U01	Activity during classes, Case study, Involvement in teamwork, Test results, Presentation, Oral answer
Social competences – Student is ready to:			
K1	Is ready for lifelong learning	DPSM2A_K03	Activity during classes, Case study, Involvement in teamwork, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	15
Auditorium classes	15
Contact hours	5
Examination or final test/colloquium	2
Participation in classes / practical placement	8
Realization of independently performed tasks	5
Student workload	Hours 50
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3, W4	1. Classification and types of enterprise 2. Legal forms of enterprise 3. Market analysis - basic instruments 4. Analysis of the environment - psychological distance in the context of entering new international markets 5. Strategies - types and classifications 6. Internationalization strategies of enterprises
Auditorium classes	U1, U2, U3, K1	



Cybersecurity & Ai System Protection

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMS.IIi1K.661e374aafab2.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Obligations
Form of study Full-time studies	Block Core Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yes

Period Semester 1	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 2
	Activities and hours Lectures: 15 Project classes: 15 Laboratory classes: 15	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	cybersecurity and AI concepts	DPSM2A_W03, DPSM2A_W04, DPSM2A_W07	Test
W2	basic techniques and tools to secure digital and AI systems	DPSM2A_W03, DPSM2A_W04, DPSM2A_W07	Test
Skills – Student can:			

U1	detect and mitigate threats in digital and AI systems	DPSM2A_U03, DPSM2A_U06, DPSM2A_U07	Project, Completion of laboratory classes
U2	prepare a cyber security strategy for the company	DPSM2A_U03, DPSM2A_U06, DPSM2A_U07	Project, Completion of laboratory classes
Social competences – Student is ready to:			
K1	Ethical use of knowledge regarding AI and the protection of digital systems	DPSM2A_K03	Test

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	15
Project classes	15
Laboratory classes	15
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 52
Workload involving teacher	Hours 45

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	1. Introduction to Cybersecurity and AI 2. Threats and Attacks in Cybersecurity
Laboratory classes	U1, U2, K1	3. Ethical Aspects of Using AI in Cybersecurity 4. Protection of AI Systems
Project classes	U1, U2, K1	5. Law and Policy in Cybersecurity and AI Protection 6. Practical Applications of AI System Protection



Green & Clean Technologies in Manufacturing

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPSMS.Ili1K.661e374abaff7.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 15 Project classes: 15	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Students will be familiar with selected modern production technologies that are compatible with environmental requirements.	DPSM2A_W01, DPSM2A_W03	Test, Presentation
W2	The student knows and understands the influence of the activities of economic organizations on sustainable development.	DPSM2A_W03, DPSM2A_W05	Test, Presentation

W3	Students will be familiar with selected modern production materials and raw materials that comply with environmental requirements.	DPSM2A_W02, DPSM2A_W03	Test, Presentation
Skills – Student can:			
U1	The student can identify the key processes influencing sustainable development in the enterprise's activities.	DPSM2A_U01, DPSM2A_U02	Project, Presentation
U2	The student can propose changes in the production process in accordance with the principles of sustainable development.	DPSM2A_U01, DPSM2A_U03	Project, Presentation
Social competences – Student is ready to:			
K1	The student is ready to work in multidisciplinary teams.	DPSM2A_K01, DPSM2A_K02	Project, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	15
Project classes	15
Examination or final test/colloquium	2
Preparation for classes	5
Contact hours	5
Preparation of project, presentation, essay, report	8
Student workload	Hours 50
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The module's content is to familiarize students with modern production systems, including technologies that reduce energy consumption and raw materials. Students will become familiar with the technological aspects and financial and economic issues of managing production systems in the context of sustainable development.
Project classes	U1, U2, K1	



Competitive Sustainable Business

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMSM.IIi7S.4c7769b33a50a129c26d7e8277962e98. 24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yeah Course shaping practical skills Yeah
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the role of competitiveness of a company	DPSM2A_W05	Test, Presentation
W2	the role of sustainable management	DPSM2A_W01	Test, Presentation
Skills – Student can:			
U1	to design and process of building company competitiveness based on sustainable management	DPSM2A_U01	Project
Social competences – Student is ready to:			

K1	to think and act in a socially responsible and entrepreneurial way	DPSM2A_K02	Project, Case study
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Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Preparation of project, presentation, essay, report	62
Examination or final test/colloquium	1
Contact hours	2
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, U1, W2, K1	1. Firm competitiveness 2. Sustainable management 3. Building competitive sustainable business
Auditorium classes	W1, U1, W2, K1	



Contemporary trends, challenges and concepts in digital technologies

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMSMS.IIi7S.661e374b1460a.24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yes
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the scope of digital technologies and key application areas of digital technologies	DPSM2A_W02, DPSM2A_W04	Test
W2	contemporary trends and concepts in digital technologies	DPSM2A_W03, DPSM2A_W04	Test
Skills – Student can:			
U1	The role and importance of digital technologies.	DPSM2A_U03, DPSM2A_U04	Project

Social competences – Student is ready to:			
K1	Effective teamwork	DPSM2A_K02	Project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Preparation for classes	thirty
Preparation of project, presentation, essay, report	28
Contact hours	5
Examination or final test/colloquium	2
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	Learning outcomes are provided through content and tasks performed during: 1. lectures discussing key issues, 2. exercises using primarily case study analysis, 3. group work in the development of a project proposal.
Auditorium classes	U1, K1	



Contemporary trends, challenges and concepts in economy and management

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMS.IIi7S.65631eefb0dac.24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yes
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	contemporary business trends	DPSM2A_W05	Test
W2	contemporary economic concepts and globalization strategies	DPSM2A_W01	Test
W3	crisis management and corporate social responsibility	DPSM2A_W05	Test
Skills – Student can:			

U1	evaluate the consequences of business decisions	DPSM2A_U01	Project
U2	evaluate business practices	DPSM2A_U03	Project
U3	provide recommendations based on the collected data	DPSM2A_U04	Project
Social competences – Student is ready to:			
K1	engage in ethical business practices	DPSM2A_K03	Project
K2	enhance organizational creativity and drive innovation using collaborative and design thinking approaches	DPSM2A_K02	Project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Preparation for classes	20
Realization of independently performed tasks	10
Preparation of project, presentation, essay, report	28
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The course module aims to provide a comprehensive understanding of contemporary business trends, economic concepts and the impact of globalization. Students will delve into the current drivers of business strategies and how global economic dynamics affect markets and politics. The curriculum also addresses the importance of crisis management and institutes a deep understanding of corporate social responsibility, emphasizing the social roles of businesses.
Auditorium classes	U1, U2, U3, K1, K2	



Eco-Innovation in Industry

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi7S.726bbcf8375ed4b0e4f52911391624f0.24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student knows the cost and benefit of implementation of eco-innovation	DPSM2A_W01	Activity during classes, Test results
W2	The student knows the role of eco-innovation in sustainable development policy	DPSM2A_W05	Test results, Presentation
Skills – Student can:			
U1	The student can recognize eco-innovation solutions	DPSM2A_U01	Case study

U2	The student can assess eco-innovation solutions using indicators and different programs	DPSM2A_U05	Activity during classes, Case study
Social competences – Student is ready to:			
K1	The student can cooperate with others in project preparation	DPSM2A_K02, DPSM2A_K03	Execution of a project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Examination or final test/colloquium	2
Preparation for classes	19
Realization of independently performed tasks	19
Contact hours	5
Preparation of project, presentation, essay, report	20
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, U1	The role of eco-innovation for the companies and organizations in current EU and global policy and regulations. Assessment of benefits for eco-innovative solutions.
Auditorium classes	U1, U2, K1	



International Transportation and Logistics Management

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMSM.IIi7S.65c13beb51b6b5a2454ee124dfa4b578.2 4 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yes
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Student has a basic knowledge on information systems and technologies for transportation and logistics operations planning and management.	DPSM2A_W02	Test results
W2	Student knows the importance of supply chain and logistics in international business operations.	DPSM2A_W05	Test results
W3	Student has a basic knowledge on international logistics and transportation systems and processes.	DPSM2A_W05	Test results

Skills – Student can:			
U1	Student is able to analyze and interpret basic indicators of assessment of international logistics and transportation processes.	DPSM2A_U01	Execution of exercises
U2	Student is able to select and use the appropriate tools and research methods used in planning, organizing and streamlining processes of international transportation, logistics and/or distribution.	DPSM2A_U03	Execution of exercises, Presentation
Social competences – Student is ready to:			
K1	Student is able to formulate objectives undertaken in the context of international logistics and transportation considering environmental and social goals.	DPSM2A_K01	Presentation
K2	Student has an ability of collaboration in a team for formulating and solving problems/tasks in the field of international logistics and transportation.	DPSM2A_K02, DPSM2A_K03	Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Preparation for classes	15
Realization of independently performed tasks	15
Examination or final test/colloquium	2
Preparation of project, presentation, essay, report	28
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The main purpose of this course is to explore the question of how transport markets will behave in the era of global trade and of the emerging transport networks that support it.
Auditorium classes	U1, U2, K1, K2	



Sustainable Development in the EU

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi7S.df27d183e31f0ceb478725f74bba5110.24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Periods Semester 1, Semester 2, Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Auditorium classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Can explain the essence of the sustainable development concept, elaborated on historical background and contemporary importance	DPSM2A_W01	Activity during classes, Participation in a discussion, Essay, Essays written during classes
Skills – Student can:			

U1	Can identify challenges of sustainable development; can analyze complex problems at various levels in the domain of sustainable development; can formulate theses concerning possible solution of the identified issues	DPSM2A_U01, DPSM2A_U08	Activity during classes, Participation in a discussion, Essay, Presentation
U2	Can identify and discuss indicators of sustainable development	DPSM2A_U01, DPSM2A_U08	Activity during classes, Participation in a discussion, Essay, Presentation
U3	Can integrated the knowledge of different domains in order to create innovative solutions to the problems of sustainable development	DPSM2A_U01, DPSM2A_U08	Activity during classes, Participation in a discussion, Essay, Presentation
U4	Can discuss the issues of sustainable development in EU as well as its implementation in the selected Member States and Neighboring States in English	DPSM2A_U01, DPSM2A_U08	Activity during classes, Participation in a discussion, Essay, Presentation
Social competences – Student is ready to:			
K1	Can identify and discuss the environmental and social impacts of production companies, corporates and businesses	DPSM2A_K02	Participation in a discussion, Essay

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Auditorium classes	thirty
Preparation for classes	40
Preparation of project, presentation, essay, report	18
Contact hours	5
Examination or final test/colloquium	2
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
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Auditorium classes	U1, U2, U3, U4, K1	Students can explain the sustainable development concept, identify its indicators, impacts, challenges, solutions and analyze complex sustainability issues at various administrative levels in the EU. 1. Challenges of implementation of the principles of Sustainable Development in the EU, e.g. multi-scale approach by Elinor Ostrom. 2. Sustainable Development concepts, such as: “the surprising power of exponential growth”, “the tragedy of the commons”, etc. 3. Serious games applications, eg Harvest game 4. Sustainable Development Goals implementation 5. Comparison of values of indicators assessing sustainable development implementation in the European Union. 6. Implementation of the rules of sustainable development at the level of the European Union and in the selected European Union Member States. 7. European Policies: sustainable development in the legal system of the European Union and of the selected European Union Member States (eg climate change policy, energy policy, water policy, environmental protection policy). 8. Instruments conditioning and encouraging
Lectures	W1	implementation of sustainable development at the level of the European Union and in the selected European Union Member States.



Robotics and Mechatronic Systems

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMS.IIi3S.661e374b399f9.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Elective
Form of study Full-time studies	Block Major Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yeah

Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 5
	Activities and hours Lectures: 30 Project classes: 30	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	principles of using robotic solutions in industry	DPSM2A_W02	Test results
W2	methods of using robotic solutions and implementing mechatronic devices in production processes	DPSM2A_W03	Test results
Skills – Student can:			
U1	implement robotics tasks on selected devices	DPSM2A_U03	Report
U2	select appropriate mechatronic devices to perform specific activities in the production process	DPSM2A_U04	Report

Social competences – Student is ready to:			
K1	to work in a team	DPSM2A_K02	Report, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Examination or final test/colloquium	2
Contact hours	5
Realization of independently performed tasks	33
Preparation of project, presentation, essay, report	25
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	Students will learn the possibilities of using robotic and mechatronic devices to perform typical production activities. They independently operate and program industrial robots.
Project classes	U1, U2, K1	



Decision-Making in Circular Supply Chain

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPSMS.IIi3S.6242cf60be444.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Elective
Form of study Full-time studies	Block Major Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yes

Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 5
	Activities and hours Lectures: 30 Project classes: 30	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	sustainable supply chain operations in the circular economy.	DPSM2A_W05, DPSM2A_W06	Participation in a discussion, Test
Skills – Student can:			
U1	evaluate decision-making processes and tools used in such chains, including the Machine Learning landscape.	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Participation in a discussion, Execution of exercises, Execution of a project, Case study

U2	select and apply decision-making tools for manufacturing and transportation problems, and solves them to satisfy the goals of circular economy concepts.	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Execution of exercises, Execution of a project, Case study
U3	apply mathematical optimization and multicriteria analysis in decision-making processes in circular supply chains.	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Execution of exercises, Execution of a project, Case study
U4	Forecasts customer service levels, inventory levels, and cost levels using Neural Networks, and AI-based classification in circular supply chains.	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Execution of exercises, Execution of a project, Case study
Social competences – Student is ready to:			
K1	synthesize and communicate the course material, including the application of the tools and techniques in decision-making processes in circular supply chains.	DPSM2A_K01	Participation in a discussion, Involvement in teamwork, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Preparation of project, presentation, essay, report	17
Preparation for classes	16
Realization of independently performed tasks	25
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
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Lectures	W1	This module delves into crucial and emerging aspects of circular supply chain management, providing students with a comprehensive understanding of the complexities that companies encounter in this field. Through in-depth discussions on a wide range of decision-making topics, students gain an overview of persistent decision-making challenges and the corresponding ORand AI-based solutions to tackle them. Throughout the course, students explore various subjects such as transportation and inventory, disassembling, forecasting, Sales & Operations Planning, logistics, and network design. Furthermore, they become acquainted with the latest developments and opportunities, such as Artificial Intelligence, to enhance circular supply chain and sustainable logistics processes.
Project classes	U1, U2, U3, U4, K1	



Combinatorial Optimization and Scheduling in Manufacturing and Services

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi3S.a5daa280fe78b2a8e42b7254ef1f113f.24 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yes
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Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Project classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the types of a production or logistic process, choosing and implementing appropriate optimization models for arising planning or scheduling problems.	DPSM2A_W06, DPSM2A_W08	Activity during classes, Execution of exercises, Test
W2	fundamental concepts and algorithms in combinatorial optimization for addressing complex scheduling problems in manufacturing and services.	DPSM2A_W06, DPSM2A_W08	Activity during classes, Test, Project, Presentation
Skills – Student can:			

U1	formulate scheduling problems and solve them using Mixed Integer Programming, combinatorial optimization methods, and tools applied in operations management.	DPSM2A_U07	Activity during classes, Execution of exercises, Project, Case study
U2	model and solve standard combinatorial problems in the area of production and operations management.	DPSM2A_U07	Activity during classes, Execution of exercises, Project, Case study
Social competences – Student is ready to:			
K1	communicate decision-making problems and solutions to them.	DPSM2A_K02	Execution of exercises, Presentation
K2	collaborate through group projects and presentations, effectively conveying optimization concepts, and collaborate with peers to solve practical challenges.	DPSM2A_K02	Execution of exercises, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Examination or final test/colloquium	2
Contact hours	5
Preparation for classes	17
Realization of independently performed tasks	16
Preparation of project, presentation, essay, report	25
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	Throughout the course, students gain practical problem-solving skills through real-world case studies and projects, including problem formulation, model development, algorithm implementation, and result interpretation.
Project classes	U1, U2, K1, K2	



Modeling and Optimization in Transport Planning

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi3S.da99b40398910cb421ed4db1a6b0df6d.2 4 Lecture languages english Mandatoriness Elective Block Major Modules Course related to scientific research Yes Course shaping practical skills Yes
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Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Project classes: 30	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	problems in the transportation of people and goods	DPSM2A_W06	Participation in a discussion, Test
W2	models and tools used in transportation planning and optimization	DPSM2A_W06	Participation in a discussion, Execution of exercises, Execution of a project, Test
Skills – Student can:			

U1	use software tools to deal with transportation planning problems	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Execution of exercises, Execution of a project, Case study
U2	identify, describe, formulate and solve transportation problems planning	DPSM2A_U04, DPSM2A_U06, DPSM2A_U08	Execution of exercises, Execution of a project, Case study
Social competences – Student is ready to:			
K1	be a leader of small project teams and to collaborate with professionals of different fields	DPSM2A_K01	Participation in a discussion, Involvement in teamwork, Presentation
K2	acquire knowledge by oneself	DPSM2A_K01	Participation in a discussion, Involvement in teamwork, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Preparation of project, presentation, essay, report	21
Preparation for classes	20
Realization of independently performed tasks	17
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
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Project classes	W2, U1, U2, K1, K2	Efficient transportation is crucial for modern society. This course provides a review of important optimization and problems planning in transit and logistics. The stress is put on different aspects of routing problems in goods transportation and city logistics as well as on matching and routing problems in last-mile delivery. Students prepare a project which consists of identification, description, analysis and original solution (optional) to a planning problem in transport and logistics.
Lectures	W1, W2	



Sustainable Energy Systems

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMS.IIi3S.661e374b79d9d.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Elective
Form of study Full-time studies	Block Major Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yeah

Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 5
	Activities and hours Lectures: 30 Project classes: 30	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student knows modern energy technologies, including renewable and alternative energy sources.	DPSM2A_W01, DPSM2A_W03	Test, Presentation
W2	The student knows the technical possibilities and limitations of energy systems development, including distributed energy.	DPSM2A_W06, DPSM2A_W08	Test, Presentation
W3	The student knows the financial and economic aspects of a sustainable energy market.	DPSM2A_W02, DPSM2A_W07	Test, Presentation

Skills – Student can:			
U1	The student can analyze energy needs for designing sustainable energy system	DPSM2A_U03	Project, Presentation
U2	The student can prepare a scope of work based on a multidisciplinary team to develop a concept for a sustainable energy system.	DPSM2A_U02, DPSM2A_U06	Project, Presentation
Social competences – Student is ready to:			
K1	The student is ready to work in a multidisciplinary team.	DPSM2A_K01, DPSM2A_K02	Project, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Examination or final test/colloquium	2
Preparation of project, presentation, essay, report	25
Contact hours	5
Preparation for classes	18
Participation in classes / practical placement	15
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Project classes	U1, U2, K1	The module's content is to familiarize students with modern production systems, including technologies that reduce energy consumption and the use of raw materials. Students will also become familiar with the technological aspects and financial and economic issues of managing production systems in the context of sustainable development.
Lectures	W1, W2, W3	



Additive methods in rapid prototyping

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMSMS.IIi3S.662650499928a.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Elective
Form of study Full-time studies	Block Major Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yes

Periods Semester 1, Semester 2	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 5
	Activities and hours Lectures: 30 Laboratory classes: 30	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	at an advanced level, issues related to the principles of engineering design of products, facilities, technical processes, operation and production of machines using computer support.	DPSM2A_W02, DPSM2A_W03, DPSM2A_W04	Test
W2	methods, techniques, technologies, tools and materials used in solving engineering tasks	DPSM2A_W02, DPSM2A_W03, DPSM2A_W04, DPSM2A_W08	Test

W3	at an advanced level, selected facts, objects and phenomena as well as issues in the field of planning, organizing, controlling, modeling and automation of technical processes using computer support	DPSM2A_W05, DPSM2A_W06, DPSM2A_W07	Test
Skills – Student can:			
U1	when formulating and solving engineering tasks - recognize their systemic and non-technical aspects, including ethical aspects; make a preliminary economic assessment of the proposed solutions and undertaken engineering activities, as well as critically analyze the functioning of existing technical solutions and evaluate these solutions	DPSM2A_U02, DPSM2A_U03, DPSM2A_U04	Activity during classes, Project, Report, Completion of laboratory classes
U2	design, in accordance with the given specification, and produce simple devices, objects, systems typical for the field of study, or implement processes, using appropriately selected methods, techniques, tools and materials, applying safety rules related to working in an industrial environment	DPSM2A_U03, DPSM2A_U04, DPSM2A_U07	Activity during classes, Project, Report, Completion of laboratory classes
Social competences – Student is ready to:			
K1	to critically assess the acquired knowledge and received content, supplement and improve the acquired knowledge and skills, seek solutions to theoretical and practical tasks according to specific priorities for the implementation of designated tasks	DPSM2A_K01, DPSM2A_K02	Activity during classes
K2	to fulfill professional roles responsibly, including managerial ones, to fulfill a task specified by oneself or others; is ready to cooperate and work in a group, follow the principles of professional ethics and demand the same from others, while taking care of the achievements and traditions of the profession	DPSM2A_K02, DPSM2A_K03	Activity during classes

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Laboratory classes	thirty
Examination or final test/colloquium	2
Preparation for classes	20
Contact hours	5
Preparation of project, presentation, essay, report	20
Realization of independently performed tasks	18
Student workload	Hours 125

Workload involving teacher	Hours 60
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* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The program of subjects implements learning outcomes in the field of knowledge, skills and social competences in the area of Management and Production Engineering, in particular: competence in the use of terminology, theoretical knowledge and practical use of specialized machines and software, the ability to carry out the prototyping process.
Laboratory classes	U1, U2, K1, K2	



English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDPMS.IIi1JO.6565b95918269.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Elective
Form of study Full-time studies	Block Foreign Language
Profiles General academic	Course related to scientific research Yeah
	Course shaping practical skills Yeah

Period Semester 1	Method of verification of the learning outcomes Exam	Number of ECTS credits 2
	Activities and hours Foreign language classes: 30	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Skills – Student can:			
U1	Can understand extensive, even detailed texts and oral statements, for example, texts from specialist literature, lectures and presentations, when they relate to the field of study and contemporary issues, as well as messages and instructions in work environment. Can interpret obtained data and information, and notice hidden meaning expressed indirectly.	DPMS2A_U08	Activity during classes, Participation in a discussion, Test, Examination

U2	Can write various types of text, for example, an extensive informative and argumentative text related to the field of study and specialization, and texts related to the results of conducted research. Can make clear and extensive oral statements, especially with the use of language related to the academic environment, work placement, recruitment, and work environment.	DPSM2A_U08	Execution of exercises, Examination, Report, Scientific paper, Essays written during classes
U3	Can prepare an extensive oral presentation related to the field of study, specialization, and professional interests. Can take an active part in discussions with a suitable degree of fluency and spontaneity, also in the professional environment, and make clear and complex statements about phenomena and ones that express various points of view.	DPSM2A_U08	Activity during classes, Participation in a discussion, Test results, Presentation
U4	Can carry on correspondence typical of work environment with the use of specialist language. Can make use of available academic and learning materials.	DPSM2A_U08	Execution of exercises, Test, Examination
U5	Can use grammatical structures, phraseology and vocabulary necessary to understand texts related to the field of study as well as general academic texts, and notice hidden meaning expressed indirectly. Can use structures and phraseology that enable fluent and spontaneous communication in the academic and professional environment with the use of accurate specialist vocabulary.	DPSM2A_U08	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Foreign language classes	thirty
Preparation for classes	10
Realization of independently performed tasks	8
Examination or final test/colloquium	2
Contact hours	5
Preparation of project, presentation, essay, report	5
Student workload	Hours 60
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

themodule

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Foreign language classes	U1, U2, U3, U4, U5	English B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING with ENGLISH as the instruction language at the Faculty of Management



French B2+ course - compulsory course for students of SECOND-CYCLE STUDIES

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPSMS.Ili1JO.6565b95923fe1.24 Lecture languages english Mandatoriness Elective Block Foreign Language Course related to scientific research Yeah Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Foreign language classes: 30	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Skills – Student can:			
U1	Can understand extensive, even detailed texts and oral statements, for example, texts from specialist literature, lectures and presentations, when they relate to the field of study and contemporary issues, as well as messages and instructions in work environment. Can interpret obtained data and information, and notice hidden meaning expressed indirectly.	DPMS2A_U08	Activity during classes, Participation in a discussion, Test, Examination

U2	Can write various types of text, for example, an extensive informative and argumentative text related to the field of study and specialization, and texts related to the results of conducted research. Can make clear and extensive oral statements, especially with the use of language related to the academic environment, work placement, recruitment, and work environment.	DPSM2A_U08	Execution of exercises, Examination, Report, Scientific paper, Essays written during classes
U3	Can prepare an extensive oral presentation related to the field of study, specialization, and professional interests. Can take an active part in discussions with a suitable degree of fluency and spontaneity, also in the professional environment, and make clear and complex statements about phenomena and ones that express various points of view.	DPSM2A_U08	Activity during classes, Participation in a discussion, Presentation
U4	Can carry on correspondence typical of work environment with the use of specialist language. Can make use of available academic and learning materials.	DPSM2A_U08	Execution of exercises, Test, Examination
U5	Can use grammatical structures, phraseology and vocabulary necessary to understand general interest texts, contemporary socio-economic texts, academic texts and special interest texts related to the field of study, and ones that enable interaction with a degree of fluency and spontaneity for academic and professional purposes.	DPSM2A_U08	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Foreign language classes	thirty
Preparation for classes	10
Realization of independently performed tasks	8
Examination or final test/colloquium	2
Preparation of project, presentation, essay, report	5
Contact hours	5
Student workload	Hours 60
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

th module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Foreign language classes	U1, U2, U3, U4, U5	French B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING with ENGLISH as the instruction language at the Faculty of Management - French for Business Purposes



Spanish B2+ course - compulsory course for students of SECOND-CYCLE STUDIES

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPSMS.Ili1JO.6565b9592fa42.24 Lecture languages english Mandatoriness Elective Block Foreign Language Course related to scientific research Yeah Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Foreign language classes: 30	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Skills – Student can:			
U1	Can understand extensive, even detailed texts and oral statements, for example, texts from specialist literature, lectures and presentations, when they relate to the field of study and contemporary issues, as well as messages and instructions in work environment. Can interpret obtained data and information, and notice hidden meaning expressed indirectly.	DPMS2A_U08	Activity during classes, Participation in a discussion, Test, Examination

U2	Can write various types of text, for example, an extensive informative and argumentative text related to the field of study and specialization, and texts related to the results of conducted research. Can make clear and extensive oral statements, especially with the use of language related to the academic environment, work placement, recruitment, and work environment.	DPSM2A_U08	Execution of exercises, Examination, Report, Scientific paper, Essays written during classes
U3	Can prepare an extensive oral presentation related to the field of study, specialization, and professional interests. Can take an active part in discussions with a suitable degree of fluency and spontaneity, also in the professional environment, and make clear and complex statements about phenomena and ones that express various points of view.	DPSM2A_U08	Activity during classes, Participation in a discussion, Presentation
U4	Can carry on correspondence typical of work environment with the use of specialist language. Can make use of available academic and learning materials.	DPSM2A_U08	Execution of exercises, Test, Examination
U5	Can use grammatical structures, phraseology and vocabulary necessary to understand texts related to the field of study as well as general academic texts, and notice hidden meaning expressed indirectly. Can use structures and phraseology that enable fluent and spontaneous communication in the academic and professional environment with the use of accurate specialist vocabulary.	DPSM2A_U08	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Foreign language classes	thirty
Preparation for classes	10
Realization of independently performed tasks	8
Examination or final test/colloquium	2
Contact hours	5
Preparation of project, presentation, essay, report	5
Student workload	Hours 60
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

themodule

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Foreign language classes	U1, U2, U3, U4, U5	Spanish B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING with ENGLISH as the instruction language at the Faculty of Management - Spanish for Business Purposes



German B2+ course - compulsory course for students of SECOND-CYCLE STUDIES

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMSMS.Ili1JO.6565b9593b5e9.24 Lecture languages english Mandatoriness Elective Block Foreign Language Course related to scientific research Yeah Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Foreign language classes: 30	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Skills – Student can:			
U1	Can understand extensive, even detailed texts and oral statements, for example, texts from specialist literature, lectures and presentations, when they relate to the field of study and contemporary issues, as well as messages and instructions in work environment. Can interpret obtained data and information, and notice hidden meaning expressed indirectly.	DPMS2A_U08	Activity during classes, Participation in a discussion, Test, Examination

U2	Can write various types of text, for example, an extensive informative and argumentative text related to the field of study and specialization, and texts related to the results of conducted research. Can make clear and extensive oral statements, especially with the use of language related to the academic environment, work placement, recruitment, and work environment.	DPSM2A_U08	Execution of exercises, Examination, Report, Scientific paper, Essays written during classes
U3	Can prepare an extensive oral presentation related to the field of study, specialization, and professional interests. Can take an active part in discussions with a suitable degree of fluency and spontaneity, also in the professional environment, and make clear and complex statements about phenomena and ones that express various points of view.	DPSM2A_U08	Activity during classes, Participation in a discussion, Presentation
U4	Can carry on correspondence typical of work environment with the use of specialist language. Can make use of available academic and learning materials.	DPSM2A_U08	Execution of exercises, Test, Examination
U5	Can use grammatical structures, phraseology and vocabulary necessary to understand texts related to the field of study as well as general academic texts, and notice hidden meaning expressed indirectly. Can use structures and phraseology that enable fluent and spontaneous communication in the academic and professional environment with the use of accurate specialist vocabulary.	DPSM2A_U08	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Foreign language classes	thirty
Preparation for classes	10
Realization of independently performed tasks	8
Examination or final test/colloquium	2
Contact hours	5
Preparation of project, presentation, essay, report	5
Student workload	Hours 60
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

themodule

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Foreign language classes	U1, U2, U3, U4, U5	German B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING with ENGLISH as the instruction language at the Faculty of Management



Russian B2+ course - compulsory course for students of SECOND-CYCLE STUDIES

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMS.IIi1JO.6565b959473e1.24 Lecture languages english Mandatoriness Elective Block Foreign Language Course related to scientific research Yeah Course shaping practical skills Yeah
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Period Semester 1	Method of verification of the learning outcomes Exam Activities and hours Foreign language classes: 30	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Skills – Student can:			
U1	Can understand extensive, even detailed texts and oral statements, for example, texts from specialist literature, lectures and presentations, when they relate to the field of study and contemporary issues, as well as messages and instructions in work environment. Can interpret obtained data and information, and notice hidden meaning expressed indirectly.	DPMS2A_U08	Activity during classes, Participation in a discussion, Test, Examination

U2	Can write various types of text, for example, an extensive informative and argumentative text related to the field of study and specialization, and texts related to the results of conducted research. Can make clear and extensive oral statements, especially with the use of language related to the academic environment, work placement, recruitment, and work environment.	DPSM2A_U08	Execution of exercises, Examination, Report, Scientific paper, Essays written during classes
U3	Can prepare an extensive oral presentation related to the field of study, specialization, and professional interests. Can take an active part in discussions with a suitable degree of fluency and spontaneity, also in the professional environment, and make clear and complex statements about phenomena and ones that express various points of view.	DPSM2A_U08	Activity during classes, Participation in a discussion, Presentation
U4	Can carry on correspondence typical of work environment with the use of specialist language. Can make use of available academic and learning materials.	DPSM2A_U08	Execution of exercises, Test, Examination
U5	Can use grammatical structures, phraseology and vocabulary necessary to understand texts related to the field of study as well as general academic texts, and notice hidden meaning expressed indirectly. Can use structures and phraseology that enable fluent and spontaneous communication in the academic and professional environment with the use of accurate specialist vocabulary.	DPSM2A_U08	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Test results

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Foreign language classes	thirty
Preparation for classes	10
Realization of independently performed tasks	8
Examination or final test/colloquium	2
Contact hours	5
Preparation of project, presentation, essay, report	5
Student workload	Hours 60
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to

themodule

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Foreign language classes	U1, U2, U3, U4, U5	Russian B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in DIGITAL PRODUCTION FOR SUSTAINABLE MANUFACTURING with ENGLISH as the instruction language at the Faculty of Management - Russian for Business Purposes



Business Simulation

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDP SMS.II2K.661e374c19a31.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Obligations
Form of study Full-time studies	Block Core Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yes

Period Semester 2	Method of verification of the learning outcomes Completing the classes	Number of ECTS credits 1
	Activities and hours Laboratory classes: 15	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student knows and understands the basic methods of analyzing and evaluating production implementation in a company.	DPSM2A_W05	Report
W2	The student knows and understands the mechanisms of operation of manufacturing enterprises	DPSM2A_W05	Report



W3	The student knows and understands the relationships between the parameters of the production process and the other subsystems of the enterprise.	DPSM2A_W07	Report
Skills – Student can:			
U1	The student is able to make operational and strategic decisions related to conducting production activities	DPSM2A_U01	Report
U2	The student is able to evaluate and interpret key production indicators in the enterprise	DPSM2A_U01	Report

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Laboratory classes	15
Preparation for classes	5
Contact hours	5
Student workload	Hours 25
Workload involving teacher	Hours 15

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Laboratory classes	W1, W2, W3, U1, U2	Appropriately selected content enables understanding the mechanisms of creating systems for analyzing and evaluating production activities, particularly learning methods of economically assessing the effects of decisions in the production sphere.



Digital Plant and Buildings Simulation

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi2K.661e374bea1a3.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yes
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Period Semester 2	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Project classes: 30 Laboratory classes: 15	Number of ECTS credits 5
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the meaning and importance of management for the functioning and development of enterprises	DPSM2A_W01	Test
W2	using modern models, methods and information and communication technologies to manage in Industry 4.0	DPSM2A_W02, DPSM2A_W03	Test
W3	modern integrated building management systems - Building Management System	DPSM2A_W07, DPSM2A_W08	Test

Skills – Student can:			
U1	characterize the essence of management and define its significance for enterprises in Industry 4.0	DPSM2A_U02, DPSM2A_U03	Project, Presentation
U2	develop a project for solving a problem with the application of modern information and communication technologies to business management	DPSM2A_U03, DPSM2A_U04	Project, Presentation
U3	use modern building management systems	DPSM2A_U07, DPSM2A_U08	Project, Presentation
Social competences – Student is ready to:			
K1	continuously update and acquire new knowledge and skills, including the independent use of modern digital technologies	DPSM2A_K02	Project, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Laboratory classes	15
Preparation for classes	20
Preparation of project, presentation, essay, report	23
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 75

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	The curriculum combines elements of design engineering with management automation, using a dedicated programming language to support applications. The course includes a set of IT tools to support the entire production cycle - from the planning and design phase, through simulation to actual production. The course also includes a module on how to operate a Building Management System, which is essential for modern or retrofitted buildings.
Laboratory classes	U1, U2, U3, K1	
Project classes	U1, U2, U3, K1	



Green Product Design

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing	Didactic cycle 2024/2025
Major All	Course code ZRDP SMS.IIi2K.661e374bd362e.24
Organizational unit Faculty of Management	Lecture languages english
Study level Second-cycle (engineer) program	Mandatoriness Obligations
Form of study Full-time studies	Block Core Modules
Profiles General academic	Course related to scientific research Yes
	Course shaping practical skills Yes

Period Semester 2	Method of verification of the learning outcomes Exam	Number of ECTS credits 5
	Activities and hours Lectures: 30 Project classes: 15 Laboratory classes: 15	

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Knows and understands rules and stages of designing a new product	DPSM2A_W02, DPSM2A_W04	Test, Examination
W2	Knows and understands green product design concept	DPSM2A_W05, DPSM2A_W06	Test, Examination
W3	Knows and understands LCA definition, structure and tasks	DPSM2A_W04, DPSM2A_W08	Test, Examination

Skills – Student can:			
U1	Knows how to use the ECOIVENT database for product design	DPSM2A_U01	Project, Presentation
U2	Can use Monte Carlo Method to forecast the range of possible outcomes	DPSM2A_U03	Project, Presentation
U3	Can evaluate the impact of the product life cycle on the product design process	DPSM2A_U04	Project, Presentation
U4	Can plan and conduct experiments in the area of green products	DPSM2A_U04	Project, Presentation
Social competences – Student is ready to:			
K1	Ready to initiate and participate in the preparation of social projects	DPSM2A_K02	Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	15
Laboratory classes	15
Preparation for classes	20
Realization of independently performed tasks	20
Preparation of project, presentation, essay, report	18
Examination or final test/colloquium	2
Contact hours	5
Student workload	Hours 125
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
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Lectures	W1, W2, W3, U2, U3, U4, K1	The objective of this module is to introduce students to contemporary methods employed for evaluating the environmental impact of newly designed products. It focuses on equipping students with knowledge about: environmental Impact Assessment (EIA), Life Cycle Assessment (LCA), Computer Tools. By delving into these methods, students will gain insights into sustainable design practices and contribute to minimizing environmental footprints.
Laboratory classes	U2, U3, U4, K1, U1	
Project classes	U2, U3, U4, K1, U1	



Industrial Eco-Efficiency

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMSMS.IIi2K.661e374c0e69a.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Period Semester 2	Method of verification of the learning outcomes Exam Activities and hours Lectures: 15 Auditorium classes: 15	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the basic concepts of industrial eco-efficiency	DPSM2A_W01	Participation in a discussion, Test
W2	how to evaluate the industrial eco-efficiency both on industry and company level	DPSM2A_W02	Participation in a discussion, Test
Skills – Student can:			
U1	conducts analysis of various projects	DPSM2A_U01	Participation in a discussion, Presentation

U2	assesses the effects of implemented projects	DPSM2A_U02	Participation in a discussion, Presentation
Social competences – Student is ready to:			
K1	undertake the economic activity in sustainable environment	DPSM2A_K02	Participation in a discussion, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	15
Auditorium classes	15
Preparation for classes	5
Preparation of project, presentation, essay, report	8
Contact hours	5
Examination or final test/colloquium	2
Student workload	Hours 50
Workload involving teacher	Hours thirty

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	Students will gain knowledge into the process of eco-efficiency evaluation both on industry and company level. In connection to this, they will be able to prepare the analysis of various projects.
Auditorium classes	U1, U2, K1	



Modeling and Process Optimization

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi2K.661e374bdebe0.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yes Course shaping practical skills Yes
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Period Semester 2	Method of verification of the learning outcomes Exam Activities and hours Lectures: 30 Project classes: 15 Laboratory classes: 15	Number of ECTS credits 2
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	the core concepts of Business Process Managements concepts, and can explain the rationale for their use, advantages and limitations	DPSM2A_W01	Execution of laboratory classes, Project, examination, Presentation
W2	the impact of process management on organizational effectiveness	DPSM2A_W01, DPSM2A_W05	Examination, Case study, Presentation
Skills – Student can:			

U1	to define the organization's value chain, identify the main and auxiliary business processes, and to analyze practical case studies and proposes solutions to problems based on learned features and principles of process design.	DPSM2A_U01, DPSM2A_U08	Activity during classes, Execution of laboratory classes, Project, Case study, Presentation
U2	to model processes using standard notations, to apply methods of analysis of execution time, quality and cost of processes, and to propose improvements in process execution.	DPSM2A_U04, DPSM2A_U08	Activity during classes, Execution of laboratory classes, Project, Presentation
Social competences – Student is ready to:			
K1	be a leader of small project teams and to collaborate with professionals of different fields	DPSM2A_K01	Activity during classes, Project, Case study, Involvement in teamwork, Presentation
K2	acquire knowledge by oneself	DPSM2A_K01	Activity during classes, Execution of laboratory classes

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	15
Laboratory classes	15
Student workload	Hours 60
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2	Efficient value chains are crucial for modern companies. This course provides an introduction to Business Process Management. The stress is put on understanding the core components of BPM as well as modeling processes using standard notations. Students fulfill series of exercises helping them to get fluency in defining processes, modeling them, suggesting improvements and testing the results.
Laboratory classes	W1, W2, U1, U2, K1, K2	
Project classes	W1, U1, U2, K1, K2	



Research Methods in Management

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi2P.b8dadd94be64c8b6713c09aa120fbdd8.2 4 Lecture languages english Mandatoriness Obligations Block Foundation Modules Course related to scientific research Yes Course shaping practical skills Yeah
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Period Semester 2	Method of verification of the learning outcomes Completing the classes Activities and hours Lectures: 30 Project classes: 30	Number of ECTS credits 4
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	main types of research methods in management	DPSM2A_W06	Test,Project
W2	forms and properties of main types of econometric models	DPSM2A_W07, DPSM2A_W08	Test,Project
W3	advantages and disadvantages of basic tools used in multivariate analysis	DPSM2A_W07, DPSM2A_W08	Test,Project
Skills – Student can:			

U1	construct and verify linear econometric model	DPSM2A_U03, DPSM2A_U04	Test,Project
U2	use multivariate analysis to solve problems of classification and regression	DPSM2A_U03, DPSM2A_U04	Test,Project
Social competences – Student is ready to:			
K1	uses information sources to improve knowledge and skills	DPSM2A_K01, DPSM2A_K02	Project

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Lectures	thirty
Project classes	thirty
Preparation for classes	25
Contact hours	5
Preparation of project, presentation, essay, report	23
Examination or final test/colloquium	2
Student workload	Hours 115
Workload involving teacher	Hours 60

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Lectures	W1, W2, W3	Obtaining learning outcomes will be possible by familiarizing students with the material presented during the lecture and conducting practical classes.
Project classes	U1, U2, K1	



Diploma Thesis

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDP SMS.IIi4K.e53bc1ffec52171870fc55d1cec2fa6a.24 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yeah Course shaping practical skills Yes
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Period Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Diploma Thesis: 0	Number of ECTS credits 20
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	The student knows the rules for preparing and defending the thesis	DPSM2A_W05	Activity during classes, Participation in a discussion, Diploma thesis
W2	The student has the structured knowledge of phenomena, processes, and objects related to the implementation of the topic of the thesis	DPSM2A_W04, DPSM2A_W05	Diploma thesis
Skills – Student can:			

U1	The student is able to work independently on preparing the thesis, conduct research, formulate conclusions	DPSM2A_U05, DPSM2A_U07	Activity during classes, Participation in a discussion, Diploma thesis
Social competences – Student is ready to:			
K1	Is ready to write and defend its thesis	DPSM2A_K01	Diploma thesis

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Contact hours	120
Realization of independently performed tasks	380
Student workload	Hours 500

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Diploma Thesis	W1, W2, U1, K1	1. Consultation on the concept and scope of the thesis, the research methods conducted, the construction of computational and laboratory models, measurements and calculations. 2. Consultation on the layout of the thesis and the development of its individual chapters. 3. Student's own work including research and calculations and final development of the thesis form.



Diploma Seminar

Course description sheet

Basic information

Field of study Digital Production for Sustainable Manufacturing Major All Organizational unit Faculty of Management Study level Second-cycle (engineer) program Form of study Full-time studies Profiles General academic	Didactic cycle 2024/2025 Course code ZRDPMS.IIi4K.113e607328fe3b1feac36d5c37a13bcd.2 4 Lecture languages english Mandatoriness Obligations Block Core Modules Course related to scientific research Yeah Course shaping practical skills Yes
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Period Semester 3	Method of verification of the learning outcomes Completing the classes Activities and hours Seminars: 15	Number of ECTS credits 1
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Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	Knows the basics of social science methodology and is able to select and use research sources and methods to obtain material for the thesis preparation	DPSM2A_W08	Presentation
Skills – Student can:			
U1	Be able to formulate a research problem, identify relevant sources and select appropriate research methods.	DPSM2A_U03	Activity during classes, Presentation

U2	Be able to conduct research independently in the selected research area	DPSM2A_U01	Activity during classes, Presentation
U3	Can interpret the research material obtained and present the results of his/her investigations in an appropriate manner.	DPSM2A_U06	Activity during classes, Presentation
Social competences – Student is ready to:			
K1	Is ready to study the literature independently and to complete the knowledge and skills for the task undertaken	DPSM2A_K01	Activity during classes, Presentation

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Seminars	15
Contact hours	5
Realization of independently performed tasks	5
Student workload	Hours 25
Workload involving teacher	Hours 15

* hour means 45 minutes

Content program ensuring the achievement of the learning outcomes prescribed to the module

Activities	Course's learning outcomes	Content program ensuring the achievement of the learning outcomes prescribed to the module
Seminars	W1, U1, K1, U2, U3	As part of the module, students: - become familiar with the Faculty's rules for conducting the diploma examination and defending the diploma thesis, - become acquainted with the rules binding at the Faculty for writing the diploma thesis, - learn correct construction of a plan and structure of the thesis, - learn to select and select sources of literature and their correct use, - exchange views on issues covered in their research areas.

Detailed rules for implementing the study program established by the dean of the faculty (so-called study rules)

Direction: Digital Production for Sustainable Manufacturing

Registration rules for the next semester

The rules for registering for the next semester are regulated by the Study Regulations applicable in a given academic year.

To obtain entry it is necessary:

- completing all modules of classes specified in the study program applicable to a given field of study, level and profile, provided for in the plan of this semester of studies
- obtaining 27-33 ECTS points, depending on the semester planned for implementation under a given study plan.

The condition for passing the last semester of studies is to pass all course modules specified in the study program applicable to a given field of study and provided for in the plan of this semester of study, with the exception of the diploma thesis.

Rules for registering for the next semester of studies under the so-called permissible deficit of ECTS points

If the standard conditions for registration for the next semester are not met, it is possible to apply for registration for the next semester of studies with the so-called permissible total deficit of points. The permissible total deficit of points is 15 ECTS.

Acceptable deficit of ECTS points

15

Organization of classes within the so-called blocks of classes (i.e. such organization of subjects or individual forms of classes that provides for deviations from the cyclical nature of classes in individual weeks in a given semester of studies)

Not applicable.

Control semesters

Lack.

Rules for pursuing studies according to the individual organization of studies

Individual study organization may be granted to students:

- particularly gifted and outstanding in learning, with
- disabilities,
- in a difficult life situation,
- taking part in sports competitions at national or international level, wishing to complete
- part of their studies at another university,
- students in more than one field of study, elected to the collegial body
- of the University, foreigners taking a Polish language course, full-time
- students who are pregnant, students of full-time studies who are
- parents.
-
- who wish to carry out a research project or a scientific project as part of a research education path under the "Excellence Initiative Research University (IDUB)" project.

Individual organization of the study program may consist in particular in:

- individual selection of course modules, methods and forms of education,
- modification of the form of tests and examinations,

- modification of the number of ECTS points required to complete a semester of studies,
- modifying the weekly schedule of classes, if possible by selecting a class group and/or class hours, in a way that enables the implementation of the applicable study program while adapting to the student's time possibilities,
- changes in the dates of exams and tests, in consultation with the teacher of the subject or class.

Individual organization of studies may concern classes within one or several semesters or the entire course of studies and may not lead to a change in the field of study learning outcomes and compulsory modules specified in the study program for a given field of study, level and profile of education, or to an extension of the deadline for completing studies. . IOS does not exempt the student from attending classes.

A student interested in the IOS study mode submits a correctly completed and documented application to the Dean of the Faculty immediately after the reason for granting the IOS occurs. The Dean of the Faculty makes a decision within 14 days, about which the student is informed by e-mail. If the application is approved, the student signs and accepts the conditions for individual organization of studies.

The scope of individualization of the study program, including semester study plans, is determined and approved by the Dean of the Faculty, taking into account:

- current course of studies,
- technical and economic possibilities of individualizing the organization of studies,
- superior provisions resulting from resolutions, orders and regulations regarding the education process.

The scientific and didactic supervisor, responsible for the entire student's education process according to the individual organization of studies, including the study plan, is appointed by the Dean of the Faculty. The scientific and didactic supervisor proposes an individual study program, including a study plan. After the Dean's approval, he/she exercises scientific and didactic supervision over the student, reports any deviations from the adopted program and study plan to the Dean of the Faculty, and creates adjustments to the individual study program.

If a student fails a module that was to be completed as part of an individual study organization, he or she is obliged to repeat the module resulting from the applicable study plan. The above rule also applies to students for whom equivalent modules have been designated as a result of international agreements.

Conditions for the implementation of professional internships, in particular the system of internship control and crediting

Not applicable.

Principles of electivity of course modules

The elective module is selected by the student from among modules belonging to a specific larger set given in the study program. From among the proposed modules, the Dean each time selects those that may be launched in a given semester, depending on the capabilities of the Faculty and the availability of academic teachers. Students select on the e-learning platform or in the University's IT system a specific number of modules for a given semester, resulting from the ECTS points allocated in a given study plan. The qualification rules for a given elective module are made public before the selection procedure begins.

Rules for selecting educational paths, diploma paths or specializations or qualifications for them

Not applicable.

Conditions and requirements related to the preparation of diploma projects and theses and the implementation of the diploma process

The student works on the diploma thesis under the supervision of an authorized academic teacher (thesis supervisor). The student selects the topic of the thesis from among the topics proposed by the supervisors and placed in the USOS system or agrees it with the supervisor.

A student may be admitted to the diploma examination if:

- completed all course modules provided for in the study program;
- submitted his diploma thesis.

The diploma examination includes:

- presentation of the diploma thesis,
- discussion of the thesis,
- checking the level of knowledge and skills in the field of study.

The issues for the diploma examination checking the level of knowledge and skills in the field of study are published on the Faculty's website. Each part of the diploma examination is assessed separately, and the grade for the diploma examination is the arithmetic mean of all parts. The diploma examination ends with the announcement of the final result of studies and, if a positive grade is obtained, with the awarding of an appropriate title by the chairman of the Committee. A publication related to the learning outcomes achieved in a given field, level and profile of studies in a peer-reviewed journal included in the list of scientific journals and peer-reviewed materials from international conferences announced by the minister responsible for matters of higher education and science of July 17, 2023 pursuant to Art. 267 section 3 of the Act of July 20, 2018, Law on Higher Education and Science (Journal of Laws of 2023, items 742, 1088 and 1234) for a minimum of 70 points.

The diploma thesis in the form of an article is prepared independently or as co-authorship of no more than 2 people, with the student's contribution being no less than 50% and confirmed in a statement submitted by both co-authors. Declarations of co-authors are attached to the submitted copy of the work.

The student is obliged to submit an application for recognition of the prepared scientific article as a diploma thesis, in the topic of his or her choice, no later than one semester before the planned date of graduation, indicating in the application the co-author of the article. The consent to recognize the prepared scientific article as a diploma thesis on the application is granted by the Vice-Dean of the Faculty after seeking the opinion of at least one of the following persons:

- student's research supervisor,
- the co-author of the scientific article indicated in the application,
- the head of the Department or Laboratory where the student conducts research.

At the time of submission of the application, the article should be published or accepted for publication. This fact should be documented by a certificate issued by the Publishing House.

Rules for determining the overall graduation result

The final grade entered on the graduation diploma is determined in accordance with the Study Regulations. The final grade is calculated based on:

- average grade from studies with a weight of 60%,
- the assessment of the thesis, agreed by the supervisor and the reviewer, with a weight of 20%, the
- assessment of the diploma examination with a weight of 20%.

Other requirements related to the implementation of the study program resulting from the Study Regulations or other regulations in force at the University

Not applicable.

The program of the "Digital Production and Sustainable Production" major refers to a modern approach to production management, manifested by the digital integration of all production activities in the context of globalization and minimizing the negative impact on the natural environment.

The graduate will be fluent in issues related to the design, planning and organization of main and accompanying (auxiliary) production processes, starting from the digital design of products, processes and production systems, ending with settlement, control and process improvement.

After graduating, the graduate will be able to take up employment in manufacturing companies in managerial and engineering positions focused on the use of advanced, intelligent production systems and will be prepared to perform tasks related to the design and development of systems, planning and control of digital production, designing green products and reducing the negative impact production on the environment.



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