Lodz University of Technology

Study programme

Faculty:	Faculty of Chemistry
Major:	Nanotechnology (in English)
Level of study:	second-cycle programme (magister)
Form of study:	full-time studies
Academic year:	2026/27

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Basic information

Name of the field of study:	Nanotechnology (in English)
Level of study:	second-cycle programme (magister)
Study profile:	general academic
Form of studies:	full-time studies
Duration of studies (number of semesters):	3
The number of ECTS points required to complete studies:	90
Total number of hours of classes:	1150
The number of ECTS points a student obtains as part of classes conducted with the direct participation of academic teachers or other persons conducting classes:	46
Professional title awarded to graduates:	magister
ISCED code:	0531
Language of study:	English

Assigning the course to the disciplines to which the learning outcomes relate

Discipline	Percentage share
Chemical science	100%

Learning outcomes (in relation to the PQF)

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
1	**2NAN1**	Possesses advanced knowledge, including detailed expertise in nanomaterials, nanoscience, and nanotechnology, as well as their physical, chemical, and biological foundations, and understands their significance, applications, and development trends, including in the context of the fundamental dilemmas of contemporary civilization.	P7U_W	P7S_WG, P7S_WK
2	**2NAN2**	Possesses structured and advanced knowledge of the methods for obtaining nanomaterials and of their properties.	P7U_W	P7S_WG
3	**2NAN3**	Possesses advanced knowledge of the state-of-the-art research techniques used in nanoscience and nanotechnology, understands their theoretical foundations, application ranges and limitations, as well as their significance for the development of new technologies and innovations.	P7U_W	P7S_WG
4	**2NAN4**	Understands the concepts and regulations related to intellectual property protection, copyright and industrial property law, as well as the economic and ethical conditions of professional activity, including the basic principles of establishing and operating enterprises.	P7U_W	P7S_WK
5	**2NAN5**	Is able to formulate and verify hypotheses and to solve complex problems in nanoscience and nanotechnology in an innovative manner, using critical analysis of available information, selecting or developing research methods and tools, planning and conducting experiments, interpreting the results and formulating conclusions.	P7U_U	P7S_UW
6	**2NAN6**	Is able to analyse multidimensional data and use computational tools for interpreting research results.	P7U_U	P7S_UW
7	**2NAN7**	Communicates with diverse audiences in the field of nanoscience and nanotechnology; uses a foreign language at the B2+ level and applies specialist terminology, actively participating in debate.	P7U_U	P7S_UW, P7S_UK
8	**2NAN8**	Is able to work effectively in a team, assuming various roles, including management, and building an environment conducive to achieving shared goals and continuous improvement.	P7U_U	P7S_UO, P7S_UU
9	**2NAN9**	Is ready to recognise the importance of knowledge, including expert knowledge, in solving cognitive and practical problems in nanotechnology and related fields, as well as to critically assess the information possessed and the content received.	P7U_K	P7S_KK

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
10	**2NAN10**	Is ready to fulfil social responsibilities, inspire and organise activities for the benefit of the community, initiate undertakings in the public interest, and think and act entrepreneurially, while adhering to the principles of ethics, sustainable development and professional responsibility in nanotechnology and related fields.	P7U_K	P7S_KO, P7S_KR

Matrix of course modules in relation to learning outcomes and curriculum content

No.	Course name	Program content	2NAN1	2NAN2	2NAN3	2NAN4	2NAN5	2NAN6	2NAN7	2NAN8	2NAN9	2NAN10
1	Structure and Surface of Nanomaterials	The goals and objectives of structural analysis of solids, types of research methods, sampling and storage of nanomaterials, crystal definition, symmetry, crystallographic systems, point and space groups, X-ray characteristics, diffraction geometry, structure factors, fundamentals of Fourier analysis and electron density topology, polycrystalline methods, diffractometers, fundamentals of scanning and transmission electron microscopy, and fluorescence surface analysis. Analysis of nanomaterial samples: X-ray analysis of single crystals and polycrystals, scanning electron microscopy with fluorescence mapping, TOF-SIMS, and ICP-MS with laser ablation.										
2	Nanomaterials for Medicine	The definition and scope of nanomedicine, the size scale of biological systems and its relationship to nanomaterials, the interaction of nanostructures with biomolecules, cells, and tissues, types of medical nanomaterials, their structure, synthesis, properties, and applications, including the specific role of polymers as drug carriers and therapeutic systems, passive and stimuli-responsive, externally controlled, and capable of selective tissue accumulation, as well as gene therapy using viral and polymer vectors and research on artificial blood cells. Magnetic nanoparticles in diagnostics and therapy, nanogels and dendrimers, sensors, assays, macroscopic materials with nanostructures, polymer nanoengineering, nanolayers, microchips, molecular imprinting, tissue engineering, nanomaterial research methods, toxicity and hazards, and the future of nanomedicine, including nanodevices and nanorobots. Application of molecular spectroscopy and laser techniques (NMR, EPR, IR, UV, Raman, SERS, CARS), group theory in spectral analysis, radiation synthesis of metal nanoparticles, studies of radiolysis of silver and bimetallic aggregates, properties of albumin (HSA) as a drug carrier, spectroscopic methods for the analysis of drug–protein and DNA–intercalator interactions, photochemistry and emission processes. Standards and regulations concerning the biocompatibility and sterilization of biomaterials and medical devices.										
3	Physicochemical Properties of Nanomaterials	Design of various classes of nanomaterials for applications in medicine, electronics, optoelectronics, biology, food industry, environmental protection and as structural materials, considering their properties, functions and roles in systems such as drug carriers, electronic components, packaging materials and biosensors. Analysis of technical and economic conditions for manufacturing and using nanomaterials, assessment of health and environmental issues and waste disposal methods. Project implementation based on Case Study and Problem/Project Based Learning methods, using scientific databases, bibliographic standards and management tools, covering three main topics: polymer nanomaterials, hybrid nanomaterials and nanomaterials in electro-optics.										
4	Technologies for Obtaining Polymeric Nanomaterials	Technologies for producing polymer nanomaterials, their properties and applications, a discussion of modern polymer nanotechnologies, composites, self-composites, and nanocomposites, environmental aspects and the toxicity of nanoparticles. The most important applications of nanotechnology, the use of advanced research methods to verify the properties of manufactured composites. Designing products based on polymer nanomaterial production technologies and analyzing their functional properties.										
5	Pre-diploma Seminar	A short oral presentation focused on tasks planned for implementation within the research and development project, including objectives, methods and expected outcomes. The presentation is based on problem analysis, proposed solutions and an action plan in the context of the project. The speech serves as a summary and aims to assess communication skills, reasoning and understanding of project-related issues.										

No.	Course name	Program content	2NAN1	2NAN2	2NAN3	2NAN4	2NAN5	2NAN6	2NAN7	2NAN8	2NAN9	2NAN10
6	Liquid Crystals	Introduction to mesomorphism phenomena, structure and properties of liquid crystals and liquid-crystalline polymers, their phases, thermotropic and lyotropic transitions, orientation methods and structural analysis. Characteristics of composites and blends of liquid-crystalline polymers, relaxation phenomena, mechanical and optical properties, crystallization processes and the influence of external fields on structure and morphology. Discussion of research methods such as X-ray analysis and spectroscopy and current and future directions in liquid-crystalline material development.										
7	Materials and Nanomaterials for Printed Organic Electronics	Technologies for fabricating thin films from the liquid phase and the use of modern printing methods in organic and flexible electronics, with particular emphasis on material requirements and process parameters. Analysis of solution and ink properties, including their stability, wetting behaviour, and their impact on the quality and functionality of printed layers and electronic components. Design of material formulations, optimisation of fabrication conditions, and assessment of the technical, economic, and environmental aspects of the processes.										
8	Technological Standards and Norms	Basic concepts, objectives and principles of standardization and its role in technical and economic activities, standardization procedures, documents and terminology. National, European and international standardization systems, new approach directives, harmonized standards, CE marking and the role of in-house standardization in quality management systems. Preparation of standardization documents, including in-house standards, considering quality and legal requirements.										
9	Toxicology of Nanomaterials	Basic concepts of nanomaterial toxicology, their unique properties and toxicity mechanisms compared to conventional materials, including cellular interactions, oxidative stress and DNA impact. Exposure routes, biodistribution and accumulation of nanomaterials in organisms, toxicity assessment methods using in vitro and in vivo studies and advanced analytical techniques. Legal regulations, risk assessment and ethical aspects of research, along with designing toxicological analysis plans considering physicochemical properties of nanomaterials.										
10	Drug and Agrochemical Formulations	Basic concepts of drug structure, physicochemical properties and their impact on bioavailability and therapeutic effectiveness, including pharmacokinetics and administration routes. Characteristics of excipients, unit operations in manufacturing and technologies for traditional and modern dosage forms, including nanotechnology aspects in formulation. Principles of designing and evaluating pharmaceutical preparations and agrochemicals, their functional forms, application techniques and influence on crop quality and the environment.										
11	Technological Standards and Norms - Biocompatibility	Basic concepts of biocompatibility, cell and organism physiology and biological responses to biomaterials, including inflammation development and reaction mechanisms. Biological testing methods for biomaterials according to ISO standards, covering physicochemical property analysis, in vitro and in vivo tests and safety assessment. Legal regulations, ethical aspects of biomaterial use in medicine and preparation of research projects in compliance with standards and directives.										

No.	Course name	Program content	2NAN1	2NAN2	2NAN3	2NAN4	2NAN5	2NAN6	2NAN7	2NAN8	2NAN9	2NAN10
12	Chemometrics	Practical applications of chemometric methods in experimental data analysis, including fundamentals of mathematical statistics, correlation and regression, as well as data classification and clustering techniques. Use of model fitting methods, goodness-of-fit assessment and multivariate analysis, including principal component analysis (PCA). Exercises performed with spreadsheets and specialized software to develop skills in result interpretation and application of analytical tools in chemistry.										
13	Polymers for Special Applications	Highly flexible polymers. Special elastomers. Thermoelastoplastics. Polymers with enhanced mechanical properties. Adhesive and anti-adhesive polymers. Polymers with high temperature resistance. Flammability. Chemical resistance. Polymers from renewable raw materials. Aging and degradation. Barrier and insulating properties. Optical properties.										
14	Colorants Technology	Basic information about color, the mechanisms of its perception, and the properties of dyes and pigments, including absorption and fluorescence processes. Characterization of coloring substances, their structural and functional classification, applications in optical, electrochromic, and photochromic technologies, as well as in biology, medicine, and analytics. Synthesis of dyes and pigments, preparation of inks, and assessment of the properties of coloring materials in the context of modern technologies.	x	x	x		x					
15	Research and Development Project	Carrying out a semester-long research or research and development project outside the Lodz University of Technology (university, research institution, company), thematically related to the field of study.										
16	Social, Ethical, and Environmental Aspects of Science	The social importance of science and its impact on technological progress, quality of life and the relationship between humans and the environment. Ethical aspects of scientific research, responsibility for outcomes and their applications, including issues of human rights, welfare and transparency in research processes. Analysis of the environmental impact of scientific activity, sustainable development and strategies for minimizing negative effects of technology.										
17	Practical Problems of Patenting and Fundraising	Preparation and analysis of a patent application for a selected invention in the context of the requirements of the Polish Patent Office and intellectual property protection principles. Discussion of the basic assumptions regarding European Union structural funds and operational programs, including application procedures and project evaluation criteria. Development of a project to obtain funding, analysis of technical, economic, and legal aspects, and presentation of the concept in a discussion format.										
18	Foreign Language for Specialist Purposes	Features and structure of scientific texts, principles of analysis, summarizing and paraphrasing, as well as proper citation and bibliography creation with attention to plagiarism issues. Skills in describing phenomena, presenting and interpreting research results in various formats, synthesizing information from multiple sources and applying appropriate language register in scientific writing and presentations. Principles of preparing and delivering presentations, using signposting techniques, body language and developing scientific articles, case studies and reviews.							x			

No.	Course name	Program content	2NAN1	2NAN2	2NAN3	2NAN4	2NAN5	2NAN6	2NAN7	2NAN8	2NAN9	2NAN10
19	Diploma Project	Execution of an independent research-or application-oriented project that requires defining objectives, selecting appropriate methods, and critically analysing the obtained results based on the current state of knowledge and the principles of academic integrity. The project classes develop high-level skills in planning, conducting, documenting, and evaluating the project, including risk identification, tool selection, and responsible decision-making in the context of specialised applications in nanotechnology and nanoscience. The diploma seminar develops the ability to critically interpret the literature, formulate well-justified conclusions, and professionally present project progress, while the competency examination verifies integrated subject-specific knowledge and the ability to solve complex problems.										
20	Diploma Thesis	Independent development of a complex research or application-oriented problem, requiring critical analysis of the literature, appropriate selection of methods, the conduct of in-depth studies, and the interpretation of results in the context of the current state of knowledge. The thesis preparation process develops the ability to formulate well-justified conclusions, synthesise advanced scientific content, and produce a coherent, methodologically sound academic work in accordance with the principles of academic integrity. The master’s thesis verifies the ability to independently solve complex problems, integrate subject-specific knowledge, perform high-level analyses, and present results.										

ECTS - subjects

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
1	Structure and Surface of Nanomaterials	5			5	5
2	Nanomaterials for Medicine	5			5	5
3	Physicochemical Properties of Nanomaterials	7			7	7
4	Technologies for Obtaining Polymeric Nanomaterials	7			7	7
5	Pre-diploma Seminar	2				2
6	Liquid Crystals	2		2	2	2
7	Materials and Nanomaterials for Printed Organic Electronics	2		2	2	2
8	Technological Standards and Norms	2		2	2	2
9	Toxicology of Nanomaterials	2		2	2	2
10	Drug and Agrochemical Formulations	2		2	2	2
11	Technological Standards and Norms - Biocompatibility	2		2	2	2
12	Chemometrics	2		2	2	2
13	Polymers for Special Applications	2		2	2	2
14	Colorants Technology	2		2	2	2
15	Research and Development Project	30		30		30
16	Social, Ethical, and Environmental Aspects of Science	3	3			3
17	Practical Problems of Patenting and Fundraising	2	2			2
18	Foreign Language for Specialist Purposes	2				2
19	Diploma Project	3			3	3
20	Diploma Thesis	20		20	20	20

ECTS indicators

Name	Value
The total number of ECTS credits that a student must obtain through elective courses (amounting to no less than 30% of the total ECTS credits required to obtain the qualification corresponding to the given level of study)	54/90 (60%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	5
The total number of ECTS credits that a student must obtain from courses related to research conducted at the university, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	51/90 (56.67%)

Methods of verifying and assessing learning outcomes

Learning outcomes are assessed systematically using diverse methods tailored to the nature of each course. These include:

Written and oral exams – assessing theoretical knowledge, analytical and problem-solving skills.
Quizzes and partial tests – enabling ongoing progress monitoring.
Evaluation of projects and laboratory work – assessing practical skills, use of research methods, interpretation of results and teamwork.
Presentations and seminars – verifying communication skills, argumentation and presentation of research results.
Reports and documentation – assessing data analysis and reporting skills.
Competency exam, master's thesis and defence – providing comprehensive verification of knowledge, skills and social competencies.
Activity in discussions and participation in research projects – assessing engagement, independence and teamwork abilities.
Detailed verification methods for each course are included in course syllabi.

Professional internships

not applicable

Characteristics of the course

Graduate profile

Graduates of the second-cycle Nanotechnology programme possess advanced, specialised knowledge in chemistry, materials science and nanomaterials engineering, covering both the structure and surface of materials as well as their physicochemical properties, functionality and applications in modern technologies. They understand advanced relationships between the structure of nanomaterials and their properties and are able to design materials with defined parameters and functions.

They have highly developed experimental skills, including the synthesis, modification and advanced characterization techniques of nanomaterials, including polymeric and hybrid materials. They can plan and conduct complex experiments, design laboratory procedures and select research methods appropriate for scientific or application-oriented problems.

They possess advanced analytical competencies, including the ability to use specialised nanostructure characterization methods, multidimensional data analysis (chemometrics), integration of data from multiple measurement techniques, and critical evaluation of the reliability, precision and limitations of obtained results. They can formulate conclusions leading both to scientific interpretation and technological recommendations.

The graduates have well-developed project competencies, including planning and implementing complex R&D projects, assessing technological risk, evaluating the biocompatibility and toxicity of nanomaterials, and applying standards and regulations governing their use. They can identify technological problems, propose innovative solutions and assess their feasibility, safety and environmental impact.

Thanks to the Research and Development Project module, the graduates are able to independently conduct an R&D project—from problem formulation, through method selection and data analysis, to assessing implementation potential and preparing project documentation. They possess competencies necessary for work in R&D teams and for expert-level collaboration with industry.

They understand the social, ethical and environmental consequences of using nanomaterials, know the basics of patent law and intellectual property protection, and understand the mechanisms of obtaining funding for research and innovation. They have advanced communication skills, including preparing publications, reports and scientific presentations (also in a foreign language), and can work in interdisciplinary teams and lead group work.

The relationship between the field of study and the university's strategy

The Nanotechnology programme aligns with the Strategy of Lodz University of Technology for 2025–2030, whose key objective is to develop an educational model preparing graduates for the dynamically changing needs of the socio-economic environment.

The programme supports the following strategic goals:

Supporting scientific research addressing socio-economic challenges. Nanotechnology students participate in research projects linked to the industrial sector.
Developing mobility opportunities for staff, doctoral candidates and students. Students and staff regularly take part in international exchanges.
Expanding internationalisation in education. The Faculty of Chemistry offers courses and seminars in English. A key element of the curriculum is the Research & Development Project, often carried out at a foreign university, institution or company.
Under the agreement signed between Lodz University of Technology and the University of Twente (UT), students of the Faculty of Chemistry of Lodz University of Technology can obtain a PhD from both universities. The education then comprises four semesters, including one semester of regular classes at UT. The study program also allows for the choice of a track taught in English.
Conducting useful, socially and environmentally responsible research that supports a knowledge-based economy and fosters interdisciplinary research through the development of collaboration between disciplines and fields of science. Students have the opportunity to conduct research that is linked to industry, responding to social and environmental needs and supporting a knowledge-based economy. The Nanotechnology curriculum is consulted with the Business Council at the Faculty of Chemistry, ensuring its compliance with the requirements of the labor market.
Modernizing research infrastructure and developing a system for its rational use. Students of the Faculty of Chemistry at Lodz University of Technology have access to specialized equipment and modern laboratories in the Alchemium building, technological halls, and specialized biomaterials and nanomaterials laboratories.

Implementing clear and fair principles of employment, remuneration, and career advancement, while taking into account tolerance and equality policies. The recruitment process for employees at the Faculty of Chemistry at Lodz University of Technology is based on the OTM-R policy – "Open, Transparent, and Merit-Based Recruitment Process."
Continuous improvement of academic teachers' competences in modern teaching methods, the current state of knowledge, technological developments, and trends in science. Academic teachers involved in teaching in the Nanotechnology program actively participate in numerous training courses, improving their qualifications, including in modern teaching methods. Furthermore, they learn modern teaching methods from international specialists visiting the Faculty of Chemistry and participate in teaching at universities abroad.
Improving the educational offer, including supplementary forms of education, in response to the challenges of the socio-economic environment. The Business Council at the Faculty of Chemistry has a real influence on the shape of the Nanotechnology program, which responds to socio-economic challenges.
Strengthening the talent management process by individualizing the education paths of students and doctoral students. Talented students can pursue studies according to an individual study program (IPS) or an individual organization of studies (IOS) and participate in TUL's mentoring programs, such as E2TOP and “Uczelnie Przyszłości” (Universities of the Future).
Supporting the scientific development of students and doctoral students, taking into account interdisciplinarity and internationalization; as well as increasing student participation in research conducted at the university and intensifying their practical experience outside the university. Students have the opportunity to participate in interdisciplinary research projects, for example, combining topics in chemistry, biology, medicine, and materials science. They can also participate in foreign trips and exchange programs, such as Erasmus+, and internships in foreign laboratories. Students also co-author scientific publications with international reach.
Summary: Through these initiatives, the Nanotechnology programme fully aligns with the Strategy of Lodz University of Technology, offering high-quality education and preparing graduates for labour market demands.

Educational objectives and employment and continuing education opportunities

The aim of the second-cycle Nanotechnology programme is to prepare graduates for independent advanced research, design and implementation work in the field of nanomaterials and nano-scale technologies. The curriculum provides in-depth knowledge, specialised skills and social competencies necessary for work in modern scientific and industrial sectors.

Educational goals are achieved by developing:

advanced knowledge of the structure, surface properties and physicochemical characteristics of nanomaterials, and their applications in medicine, printed electronics, polymer technologies and functional materials,
skills in designing and conducting complex experiments, including synthesis, modification, and advanced characterization,
advanced analytical competencies, including nanostructure characterization, multidimensional data analysis (chemometrics) and critical interpretation of results,
project skills related to planning and implementing R&D projects, assessing technological risk and applying technological standards, innovation and implementation competencies, strengthened through the Research and Development Project module,
social, ethical and environmental awareness regarding responsible use of nanomaterials, their impact on health and the environment, and legal/patent aspects,
communication and language skills for preparing project documentation, scientific reports and presentations,
readiness for lifelong learning, doctoral studies and work requiring creativity, innovation and interdisciplinary approaches.
Career opportunities

Graduates are prepared to work in:

research and industrial laboratories,
R&D departments of technological, chemical, biotechnological and pharmaceutical companies,
certification and control units,
sectors developing advanced technologies (including medical and environmental),
technology startups and companies implementing material innovations.
They are also prepared to undertake doctoral studies and continue professional development.

Description of the process and outcome of consultations on the proposed study program with the socio-economic environment

The second-cycle Nanotechnology programme is developed in close cooperation with external partners through R&D projects, expert consultations and implementation-oriented collaboration with companies, specialised laboratories and public institutions. Students

engage in application-oriented tasks carried out in direct cooperation with external partners, enabling them to use advanced tools, analyse real technological problems and assess their social, economic and environmental impact.

Such collaboration supports the development project, research and management competences, and also foster the transfer of knowledge and innovation as well as preparation for independent action in a dynamic socio-economic environment.

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

According to the Recruitment Resolution.

The unit organizing education

Faculty of Chemistry

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Structure and Surface of Nanomaterials	Project work: 35 Lecture: 20	5	Graded assignment	Obligatory
Nanomaterials for Medicine	Project work: 35 Lecture: 20	5	Graded assignment	Obligatory
Physicochemical Properties of Nanomaterials	Project work: 65	7	Exam	Obligatory
Technologies for Obtaining Polymeric Nanomaterials	Project work: 40 Lecture: 25	7	Exam	Obligatory
Pre-diploma Seminar	Seminar: 15	2	Graded assignment	Obligatory
Elective Courses 1		4	Graded assignment	Obligatory group
The student chooses 2 courses from the group.				
Liquid Crystals	Laboratory classes: 20 Lecture: 10	2	Graded assignment	Optional
Materials and Nanomaterials for Printed Organic Electronics	Project work: 20 Lecture: 10	2	Graded assignment	Optional
Technological Standards and Norms	Project work: 20 Lecture: 10	2	Graded assignment	Optional
Toxicology of Nanomaterials	Project work: 25 Lecture: 5	2	Graded assignment	Optional
Drug and Agrochemical Formulations	Seminar: 20 Lecture: 10	2	Graded assignment	Optional
Technological Standards and Norms - Biocompatibility	Project work: 20 Lecture: 10	2	Graded assignment	Optional
Chemometrics	Laboratory classes: 30	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Polymers for Special Applications	Laboratory classes: 20 Lecture: 10	2	Graded assignment	Optional
Colorants Technology	Laboratory classes: 20 Lecture: 10	2	Graded assignment	Optional
Sum	**315**	**30**		

Semester 2

Carrying out a semester-long research or research and development project outside the Lodz University of Technology (university, research institution, company), thematically related to the field of study

Course	Number of hours	ECTS points	Form of verification	Obligatory
Research and Development Project	Total number of contact hours: 350	30	Graded assignment	Obligatory subjects to choose from
Sum	**350**	**30**		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Social, Ethical, and Environmental Aspects of Science	Seminar: 30 Lecture: 15	3	Graded assignment	Obligatory
Practical Problems of Patenting and Fundraising	Project work: 15 Lecture: 15	2	Graded assignment	Obligatory
Foreign Language for Specialist Purposes	Tutorials: 45	2	Graded assignment	Obligatory
Diploma Project	Seminar: 15 Project work: 50	3	Graded assignment + exam	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Thesis	Diploma Thesis: 0	20	Pass	Obligatory subjects to choose from
Sum	**185**	**30**		