

MINISTRY of EDUCATION and SCIENCE of UKRAINE

Ternopil Ivan Puluj national technical university

EDUCATIONAL PROGRAM

«Civil Engineering»

of the first (Bachelor's) level of higher education

on specialty 192 – Civil engineering

branch of knowledge 19 – Architecture and construction

Qualification: Bachelor in Civil Engineering

Approved by Academic Council

Head of Academic Council

_____ / P.V. Yasniy /

(Minutes № 8 of June 22, 2021)

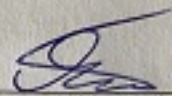
Educational program is launched in 2021-2022 academic year.

Letter of Approval
of educational-professional program

Discussed and approved on the Structural Mechanics Department Meeting

Meeting Minutes № 8 of April 28, 2021

Head of the Department

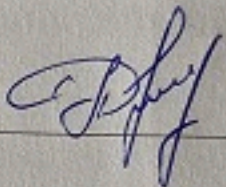


V.P. Yasniy

Discussed and approved by the Academic Council of the Faculty of Engineering
of Machines, Structures and Technologies.

Minutes № 7 of April 29, 2021

Head of the Faculty Academic Council



R.Y. Leshchuk

PREFACE

The Syllabus (S) of Bachelor's Training in Specialty 192 "Civil Engineering" is a regulatory document where the education content is summarized, the goals of educational and professional training are specified, the role of a specialist in the national economy structure is determined and both the competences describing the peculiarities of Bachelor's Training in Specialty 192 "Civil Engineering" and the learning outcomes are listed specifying the students' abilities and skills after successful completion of the Syllabus. The competencies come to an agreement with each other and they correspond to the descriptors of the National Framework of qualifications.

The syllabus has been developed by Ternopil I.Puluj national technical university on the basis of standards of higher education of Ukraine in the branch of knowledge 19 – Architecture and Construction on Specialty 192 - Civil Engineering.

The Syllabus was developed by the work project group of Specialty 192 - Civil Engineering consisting of:

1. Pidhurskyy M. I. – D.Sc. in Engineering, Professor, Prof. of the Manufacturing Engineering Department – Head of the Program;
2. Sorochak Andrii – Ph.D. in Engineering Science, Associate Prof. of the Structural Mechanics Department – a member of the project group;
3. Kononchuk Oleksandr – Ph.D. in Engineering Science, Associate Prof. of the Structural Mechanics Department - a member of the project group;
4. Kachka Oksana – chief engineer of LLC "Perspective resource"
5. Kusen Sofia – student of group МБ-21.

Reviews of external stakeholders:

1. Lylo V. Y. – managing director of LLC «Ternopilbud»;
2. Yankovyy S.Y. – director of LLC "Engineering-construction company "Architect";
3. Kaspruk B.P. – director of LLC "SMARTTECHBUD".

1. Bachelor's Training Program in Specialty 192 "Civil Engineering"

Components	Description of educational-professional program
1 – General information	
Full name of higher educational establishment and a structural subdivision	Ternopil I.Puluj national technical university, Structural Mechanics Department
Full name of qualification	First (Bachelor) level, Bachelor of Civil Engineering
Program official name	Civil Engineering
Diploma type and number of credits according to the program	Bachelor's Diploma (Single Honours), - based on Complete general secondary education – 240 credits ECTS / 4 years of study; - based on the degree, «Professional Junior Bachelor», «Junior Bachelor» (of educational-qualification level «Junior Specialist») a higher educational establishment is entitled to recognize and credit the credits ECTS of the previous educational program of Professional Junior Bachelor, Junior Bachelor (Junior Specialist) training, but not more than 60 credits ECTS (3 years of study);.
Accreditation	Accreditation commission of Ukraine (National agency of higher education quality assurance), Ukraine Certificate of accreditation HД № 2087434. Valid to July 1 st , 2024
Cycle/level	FQ-EHEA – first cycle, EQF LLL – 6 th level, HPK – 6 th level
Requirements	Certificate of complete general secondary education, Junior Bachelor diploma (Junior Specialist) of the relevant specialty. The entrance requirements are specified by «Admission Rules of the Ternopil I.Puluj national technical university» approved by the University academic council.
Language(s) of instruction	Ukrainian, English (some courses)
Educational program validity	Till next accreditation
Permanent Internet address of educational program description	http://tntu.edu.ua/storage/pages/00000484/op192b.pdf
2 – Purpose of the educational-professional program	
Training of specialists able to solve complex engineering-technical problems in the field of construction and civil engineering.	
3 – Characteristics of the educational-professional program	
Subject area	<i>Objects of study and activity:</i> buildings and engineering facilities, their design, construction technologies, maintenance and reconstruction. <i>Purpose of study:</i> form in the students a complex of knowledge, skills and abilities required for solving complex special problems and practical tasks in the field of construction and civil engineering. <i>Theoretical content of the course:</i> concepts, conceptions, principles, ways and methods of buildings and engineering facilities construction and maintenance. <i>Methods, techniques and technologies:</i> experimental methods of study of materials and processes, methods of physical and mathematical modeling, design techniques, production procedures of structures, materials and

	products, technologies of buildings construction, construction objects destroying and disposing of wastes. Tools and equipment: test-measuring devices, hardware and software necessary for a full scale, laboratory and online studies in construction and civil engineering.
Educational program orientation	Educational-professional.
Main focus of the educational program and specialization	Main focus is made on the ability in conducting design, production-technological, management activity in building companies; design, technological and scientific-research work in educational institutions; acquiring some special competencies within the study process required for a construction engineer aimed at maintenance specialization. The educational program consists of three main directions: architecture of buildings and facilities, design of building structures, building production technology and management.
Special features	Use of information technologies, science-consuming systems of automated computer-aided programming, software systems of engineering analysis and computer engineering. Possible use of academic mobility both for the theoretical and practical training of the specialists.
4 – Graduates suitability for employment and further education	
Suitability for employment	Professional activity area – creation of objects in the field of construction and civil engineering, involving design, construction (new construction, reconstruction, restoring, major structural repairs) and objects maintenance.
Further education	Possibility of study on the program of second cycle FQ-EHEA, of level 7 EQF-LLL and of level 8 HPK and get some extra qualifications within post-graduate education system.
5 – Teaching and Assessment	
Teaching and study	Passive (explanatory-illustrative); active (problem, game, interactive, project, information-computer self-developing)- according to dominating techniques and ways of teaching. Group and integrative study – according to forms of organization. Positional and context study, collaboration technology – according to pedagogical cooperation orientation.
Assessment	Students' progress in study is estimated according to 4-mark (“excellent”, “good”, ”satisfactory”, “unsatisfactory”) and verbal (“passed”, “not passed”) systems. Kinds of control: current, theme, random, final, self-control. Forms of control: oral and written questioning, tests, design projects, term papers and projects, laboratory reports, presentations, reports on internship programs and scientific-research papers, certification exam etc.
6 – Program competences	
Integral competence	Ability to solve complex specific problems of construction and civil engineering
General competences	GC 01. Ability of abstract thinking, analysis and synthesis. GC 02. Knowledge and understanding the subject area and professional activity. GC 03. Be able to speak and write in state language. GC 04. Be able to speak a foreign language. GC 05. Be able to apply information and communication technologies. GC 06. Be able to search, process and analyze information from different sources. GC 07. Interpersonal communication skills. GC 08. Be able to communicate with representatives of other professional groups (experts from other branches of knowledge/types of economic activity).

	<p>GC 09. Be able to implement rights and duties as a member of society; comprehension of value of civil (free democratic) society and the necessity of its sustainable development, supremacy of law, human rights and freedoms in Ukraine.</p> <p>GC 10. Be able to store and add moral, cultural, scientific values and achievements of society due to the understanding of history and laws of development of the subject area, its place in the general system of knowledge about nature and society and in the development of the society, engineering and technologies, apply different kinds and forms of physical activity for active rest and healthy lifestyle.</p>
Special (professional, subject area) competences	<p>SC01. Be able to apply conceptual scientific and practical knowledge of mathematics, chemistry and physics to solve complex practical problems of construction and civil engineering.</p> <p>SC02. Be able to be self-critical and use the main theories, methods and principles of economics and management for efficient organization and management of construction operations.</p> <p>SC03. Be able to design building structures, buildings, objects, engineering networks (according to the specialization) taking into account engineering-technical and resource-saving measures, legal, social, ecological, technical-economic factors, scientific and ethics aspects, and modern requirements of regulatory documents, time and other limits, in the field of architecture and construction, environment protection and labour safety.</p> <p>SC04. Be able to choose and use the proper equipment, materials, tools and methods for design and implementation of technological processes of construction operations.</p> <p>SC05. Be able to apply computer-aided design systems and special applied software to solve engineering problems of construction and civil engineering.</p> <p>SC06. Be able to be engaged in engineering activity in the field of construction, to write and use technical documents.</p> <p>SC07. Be able to bear responsibility for making decisions in the field of architecture and construction under unpredictable working context conditions.</p> <p>SC08. Be aware of principles of settlement areas design.</p> <p>SC09. Be able to arrange and manage the personal and group professional growth in the field of architecture and construction.</p>
7 – Program learning outcomes (PLO)	
Study results:	<p>LO01. Apply main theories, methods and principles of mathematical, natural, social-humanitarian and economical sciences, modern models, methods and software of decision-making support to solve complex problems of construction and civil engineering.</p> <p>LO02. Take part in research and developments in the field of construction and architecture.</p> <p>LO03. Present the results of their work and give reasons of their decisions on professional issues to specialists and non-specialists fluently speaking in state and foreign languages.</p> <p>LO04. Design and introduce technological processes of building production using the proper equipment, materials, tools and methods.</p> <p>LO05. Apply and develop technical documents on all stages of life cycle of construction products.</p> <p>LO06. Use modern information technologies to solve engineering and managerial problems of construction and civil engineering.</p> <p>LO07. Collect, interpret and use the data including due to the search, process and analyze of information from different sources.</p> <p>LO08. Efficiently use the latest construction materials, products and</p>

	<p>structures based on the knowledge of their technical specifications and production technology.</p> <p>LO09. Design building structures, buildings, objects, engineering networks and technological processes of construction taking into account engineering- technical and resource-saving measures, legal, social, ecological, technical-economic factors, scientific and ethics aspects, and modern requirements of regulatory documents, time and other limits, in the field of architecture and construction, environment protection and labor safety.</p> <p>LO10. Make and implement sustainable decisions on organization and management of construction processes at raising construction objects and their maintenance.</p> <p>LO11. Estimate the design correspondence to the design principles of urban areas and infrastructure objects and municipal facilities.</p> <p>LO12. Have advanced cognitive and practical abilities/skills, proficiency and innovativeness at the level necessary to solve complex specialized problems in the field of construction and civil engineering (according to the specialism).</p> <p>LO13. Organize and supervise the professional growth of persons and groups in the field of architecture and construction.</p>
8 – Program implementation resources	
Staff assistance	<p>According to staff assistance requirements to educational activity providing for certain level of HO (Appendix 2 to License terms and conditions), approved by the Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 with amendments to the Resolution of the Cabinet of Ministers of Ukraine №347 of 10.05.2018.</p> <p>In particular, the program implementation is provided by highly qualified staff with scientific degrees and titles with great experience in teaching, pedagogical, scientific-research, managerial and innovative work in specialty. The academic staff involved in the teaching of profession-oriented disciplines has scientific degrees in specialty and approved level of scientific and professional activity. All lecturers are the authors of textbooks, monographs, articles, participants of national and international scientific conferences.</p>
Materials and facilities	<p>According to technological requirements to materials and facilities support of educational activity of certain level of HO (Appendix 4 to License terms and conditions), approved by the Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 with amendments to the Resolution of the Cabinet of Ministers of Ukraine №347 of 10.05.2018.</p> <p>A number of specialized laboratories and computer classrooms of TNTU with special software are used for conducting research.</p>
Information support and teaching – learning materials	<p>According to technological requirements to teaching methods and information support of educational activity of certain level of HO (Appendix 5 to License terms and conditions), approved by the Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 with amendments to the Resolution of the Cabinet of Ministers of Ukraine №347 of 10.05.2018.</p> <p>Available:</p> <ul style="list-style-type: none"> - e-resources of teaching and learning materials of the courses (textbooks, teaching materials, lecture notes, study manuals); - periodicals; - E-archives of TNTU (monographs, articles, extended abstracts); - all library resources available via the university site, or in the library hall itself .

	<p>Teaching and learning materials of educational process are in the electronic repository of the university ELARTU, which is available: http://elartu.tntu.edu.ua/handle/123456789/8983. Electronic courses of the department are available for students in the system of electronic and distance learning ATUTOR: https://dl.tntu.edu.ua/browse.php?access=&category=22&speciality=0&search=&include=all&filter=Filter. The problem of providing students with textbooks and study guides is being solved by the department in two parallel ways: literature publishing by the department lecturers and their buying or subscribing by the university library. During their study the students are able to use special software to design buildings and facilities, mathematical processing of the research results. The teaching materials are constantly updating and adapting according to the stakeholders' preferences.</p>
9 – Academic mobility	
National credit mobility	<p>According to the bilateral agreements of the Ternopil I.Puluj national technical university and other universities of Ukraine some individual agreements can be signed on academic mobility for study and research in universities and scientific institutions of Ukraine.</p> <p>Some leading specialists of the universities of Ukraine may be involved into the scientific work supervision of the applicants according to the individual agreement's terms.</p> <p>The credits received in other universities of Ukraine are credited according to the document of academic mobility.</p>
International credit mobility	<p>According to the bilateral agreements of the Ternopil I.Puluj national technical university and educational institutions of the countries-partners, agreement of international academic mobility. In particular, the university has signed the agreements of academic and scientific cooperation with the leading universities of Poland: Opole polytechnic university and Lublin polytechnic.</p> <p>Individual academic mobility is possible due to the participation in programs of the project Erasmus +</p>
Foreign students training	<p>Training is provided on standard terms or according to the individual schedule in a foreign language or Ukrainian (after Ukrainian language course completion by foreign applicants).</p>
10. Forms of attestation of the first (Bachelor's) degree of higher education	
Forms of Bachelor's attestation	<p>The attestation is in the form of public defense of Qualification paper.</p>
Requirements to the Qualification paper	<p>Qualification paper involves the solving of a complex special design problem in the field of construction and/or civil engineering.</p> <p>Qualification paper must not contain any academic plagiarism, fabrication, falsification.</p> <p>Qualification paper should be released on the official site and/or in the repository of the higher education institution or its subdivision.</p>
11. System of internal provision of higher education quality	
	<p>According to «Standards and recommendations on quality assurance in European space of higher education», the statement and documents describing the structure of the quality assurance system (QAS), its goals and objectives, forms of quality control, the persons who are responsible for the control, measures which should be taken by the control results have come into action by Ternopil I.Puluj national technical university. The main document is the Statement «Quality control system of Ternopil I.Puluj national technical university. Quality policy» (approved on the Academic council meeting, Minutes № 5 of May 22, 2018, implemented by Order № 4/7-430 of 12.06.2018), which involves the following</p>

	<p>procedures and measures:</p> <ol style="list-style-type: none"> 1) determination of the principles and procedures of higher education quality assurance; 2) educational programs monitoring and updating; 3) annual assessment of higher education undergraduates, scientific-pedagogical and pedagogical staff of a higher educational institution and regular release of the assessment results on the official website of the higher educational institution, on an information board or in another way; 4) providing the career development of pedagogical, scientific and scientific-pedagogical staff; 5) necessary resources available for educational process organizing, including students' self-study on each syllabus; 6) information systems available for effective management of educational process; 7) providing the publicity of information dealing with the syllabus, higher education degrees, qualifications; 8) academic honesty assurance by the staff of higher educational institutions and the students, including creation and providing the functioning of the efficient system to prevent and find any academic plagiarism; 9) other procedures and measures. <p>Due to the results of external audit conducted by the company DQS GmbH, an international certificate was taken (registration number 31400225 QM15) of TNTU QCS meeting the standards requirements ISO 9001:2015 in the field of services provided in higher education, scientific, scientific-technical activity.</p>
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12. List of normative documents which the syllabus is based on

	<ol style="list-style-type: none"> 1. Law of Ukraine «On Higher Education» - http://zakon4.rada.gov.ua/laws/show/1556-18. 2. Law of Ukraine «On Education» – http://zakon5.rada.gov.ua/laws/show/2145-19. 3. National Classifier of Ukraine: Classifier of professions SC 003:2010. –https://zakon.rada.gov.ua/rada/show/va327609-10 4. National framework of qualifications, 2011 – http://zakon4.rada.gov.ua/laws/show/1341-2011-п. 5. List of branches of knowledge and specialties under which the training of applicants for higher education is carried out, 2015 – http://zakon4.rada.gov.ua/laws/show/266-2015-п. 6. Ordinance of the CMU № 660-p, 19.09.2018 p. «On Approval the conception of specialists' training by the dual form of education» – https://zakon.rada.gov.ua/laws/show/660-2018-%D1%80. 7. Methodical recommendations for the development of higher education standards. Approved Order of the Ministry of Education and Science of Ukraine dated 01.06.2017 № 600 (as amended by the order of the Ministry of Education and Science of Ukraine dated 30.04.2020 № 584. https://mon.gov.ua/storage/app/media/vyshcha/naukovo-metodychna_rada/2020-metod-rekomendaciyi.docx. <p>Useful references:</p> <ol style="list-style-type: none"> 1. TUNING (to be acquainted with special (professional) and general competencies and examples of standards – http://www.unideusto.org/tuningeu/. 2. National educational glossary: higher education / 2nd. ed., reviewed and amended. / Authors. : V. M. Zakharchenko, S. A. Kalashnikova, V. I. Luhovyy, A. V. Stavyts'ky, YU. M. Rashkevych, ZH. V. Talanova / Edited by V.H.Kremenya.– K. : LLC «Vydavnychyy dim «Pleyady»»,
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	<p>2014.– 100 p. – http://erasmusplus.org.ua/korysna-informatsiia/korysni-materialy/category/3-materialy-natsionalnoi-komandy-ekspertiv-shchodo-zaprovadzhennia-instrumentiv-bolonskoho-protseesu.html?download=83:hlosarii-terminiv-vyshchoi-osvity-2014-r-onovlene-vydannia-z-urakhuvanniam-polozhen-novoho-zakonu-ukrainy-pro-vyshchu-osvitu&start=80</p> <p>3. Rashkevych Yu.M. Bolons'kyi protses ta nova paradyhma vyshchoyi osvity – http://erasmusplus.org.ua/korysna-informatsiia/korysni-materialy/category/3-materialy-natsionalnoi-komandy-ekspertiv-shchodo-zaprovadzhennia-instrumentiv-bolonskoho-protseesu.html?download=82:bolonskyi-protses-nova-paradyhma-vyshchoi-osvity-yu-rashkevych&start=80</p> <p>4. Development of the system of higher education quality assurance in Ukraine: information-analytical review – http://erasmusplus.org.ua/korysna-informatsiia/korysni-materialy/category/3-materialy-natsionalnoi-komandy-ekspertiv-shchodo-zaprovadzhennia-instrumentiv-bolonskoho-protseesu.html?download=88:rozvytok-systemy-zabezpechennia-iakosti-vyshchoi-osvity-ukrainy&start=80</p> <p>5. Development of educational programs: methodical recommendations / Authors.: V.M. Zakharchenko, V.I. Luhovyy, YU.M. Rashkevych, ZH.V. Talanova / Za red. V.H. Kremenya. – K. : DP «NVTS «Priorytety», 2014. – 120 s. – http://erasmusplus.org.ua/korysna-informatsiia/korysni-materialy/category/3-materialy-natsionalnoi-komandy-ekspertiv-shchodo-zaprovadzhennia-instrumentiv-bolonskoho-protseesu.html?download=84:rozroblennia-osvitnikh-prohram-metodychni-rekomendatsii&start=80</p> <p>6. Standards and recommendations on quality assurance in European space of higher education (ESG) – https://ihed.org.ua/wp-content/uploads/2018/10/04_2016_ESG_2015.pdf</p> <p>7. International Standard Classification of Education ISCED 2011 – http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-isced-2011-en.pdf</p> <p>8. International Standard Classification of Education: Fields of education and training 2013 (ISCED-F 2013) – Detailed field descriptions – http://uis.unesco.org/sites/default/files/documents/international-standard-classification-of-education-fields-of-education-and-training-2013-detailed-field-descriptions-2015-en.pdf</p>
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Matrix of accordance of defined by the standard of competencies for NQF descriptors

Classification of competences (due to the study) according to NQF	Knowledge Kn1 Conceptual scientific and practical knowledge, critical thinking of theories, principles, methods and concepts in professional activity and/or study	Abilities/skills Ab1 Advanced cognitive and practical abilities/skills, proficiency and innovativeness on the level necessary to solve complex special tasks and practical problems in professional activity or study	Communication C1 Communicating information, ideas, problems, solutions, personal experience and arguments to specialists and non-specialists C2 Data collection, interpretation and use C3 Communication on professional issues, including in a foreign language, both speaking and writing	Responsibility and autonomy RA1 Management of complex technical or professional activities or projects RA2 Ability to take responsibility for development and adoption decisions for unpredictable work and / or learning contexts RA3 Formation of judgments that take into account social, scientific and ethical aspects RA4 Organization and management of professional development of individuals and groups RA5 Ability to continue learning with a significant degree of autonomy	
	General competences				
	GC01	Kn1	Ab1		RA3, RA 5
	GC02	Kn1	Ab1	C1	RA 5
	GC03	Kn1		C1, C3	RA 3, RA 5
	GC04	Kn1		C1, C3	RA 3, RA 5
	GC05	Kn1	Ab1	C1, C2	RA 4, RA 5
	GC06	Kn1	Ab1	C2	RA 5
	GC07	Kn1	Ab1	C1	RA 1, RA 4
	GC08	Kn1	Ab1	C1	RA1, RA3
	GC09	Kn1	Ab1	C1	RA2, RA3
GC10	Kn1	Ab1		RA2, RA3	
Special (professional) competences					
SC01	Kn1	Ab1		RA5	
SC02	Kn1		C2	RA1	
SC03	Kn1	Ab1	C2	RA3	
SC04	Kn1	Ab1	C2	RA1	
SC05	Kn1	Ab1	C2		
SC06	Kn1	Ab1	C2	RA1	
SC07	Kn1	Ab1	C1	RA2	
SC08	Kn1	Ab1	C2		
SC09	Kn1	Ab1	C1, C3	RA 1, RA 4	

2. List of Syllabus educational components and their logical sequence

2.1. List of educational components

Table 2.1

Educational components and their characteristics

A/d code	Educational program components (academic disciplines, course projects (works), practices,	Number of credits	Form of final control
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	qualification work)		
1	2	3	4
Compulsory components EP			
Cycle of general training			
CC1	Higher Mathematics	15	Exam
CC2	Foreign Language for Specific Purposes	6	Exam
CC3	History and Culture of Ukraine	5	Exam
CC4	Theoretical Mechanics	4	Exam
CC5	Technoecology and Civil Safety	4	Credit tests
CC6	Ukrainian for Specific Purposes	5	Credit tests
CC7	Physics	7,5	Exam
CC8	Physical Education	0	-
CC9	Philosophy	4	Exam
CC10	Chemistry	4	Exam
Cycle of professional training			
CC11	Architecture of Buildings and Structures	7,5	Exam, CP
CC12	Structural Mechanics	7,5	Exam
CC13	Building Material Science	9	Exam
CC14	Reinforced Concrete and Masonry Structures	7,5	Exam, CW
CC15	Engineering Geodesy	4	Exam
CC16	Engineering Graphics and CAD Systems	11	Grading tests
CC17	Metal Structures	4	Exam, CW
CC18	Strength of Materials	8,5	Exam
CC19	Fundamentals of Design Automation in Civil Engineering	4	Credit tests
CC20	Soil Mechanics and Foundations	4	Exam, CP
CC21	Fundamentals of Designing	3	Credit tests
CC22	Construction Engineering	7,5	Exam, CP
CC23	Construction Arrangement and Management	4	Exam
CC24	Fluid Mechanics	4	Exam
CC25	Residential Areas Planning and Landscaping	4	Exam
CC26	Software for Engineering Design	4	Exam
CC27	Introductory Internship	3	Grading tests
CC28	Practice in Geodesy	3	Grading tests
CC29	Technological Practice	3	Grading tests
Total credits of compulsory components		169	
Optional components EP			
Total credits of optional components		62	
QP	Bachelor's Graduation Thesis Writing and Defense	9	
TOTAL CREDITS OF THE EDUCATIONAL PROGRAM		240	

2.2. Structure-logic scheme of EP

Logic scheme of the structure of educational program components study

Compulsory components of EP			
1.1 Cycle of general training			
CC 1 History and culture of Ukraine	CC 2 Ukrainian language (for specific purpose)	CC 3 Foreign language (for specific purpose)	CC 4 Philosophy
CC 5 Physical education	CC 6 Higher mathematics	CC 7 Physics	CC 8 Chemistry
CC 9 Theoretical mechanics (CC 6, CC 7)	CC 10 Information Technologies and Fundamentals of Programming in Engineering	CC11 Technoecology and civil safety	
1.2 Cycle of professional training			
CC12 Strength of Materials (CC 9)	CC 13 Fluid mechanics (CC 7, CC 8, CC 9)	CC 14 Engineering drawing and CAD-systems (CC 10)	CC 15 Engineering geodesy (CC6)
CC 16 Building Material Science (CC 7, CC 8)	CC 17 Fundamentals of design (CC 14)	CC 18 Software for Engineering Design (CC10)	CC 19 Structural Mechanics (CC 9, CC 12)
CC 20 Fundamentals of Design Automation in Civil Engineering (CC 17, CC 18, CC 19)	CC 21 Architecture of buildings and structures (CC 16, CC 17, CC 18)	CC 22 Residential Areas Planning and Landscaping (CC11, CC 21)	CC 23 Metal structures (CC 19, CC 21)
CC24 Reinforced Concrete and Masonry Structures (CC 19, CC 21)	CC 25 Soil mechanics and foundations (CC 8, CC12)	CC 26 Construction Engineering (CC15, CC21, CC23-25)	CC 27 Construction Arrangement and Management (CC 23-CC26)
CC28 Introductory Internship	CC 29 Practice in Geodesy (CC 15)	CC 30 Technological Practice (CC 15, CC 16, CC 21)	
Bachelor's Qualification paper			

3. Forms of attestation

Forms of Bachelor's attestation	The attestation is in the form of public defense of Qualification paper.
Requirements to the Qualification paper	<p>Qualification paper involves the solving of a complex special design problem in the field of construction and/or civil engineering.</p> <p>Qualification paper must not contain any academic plagiarism, fabrication, falsification.</p> <p>Qualification paper should be released on the official site and/or in the repository of the higher education institution or its subdivision.</p>

Matrix of accordance of program competences to educational program components

	CC1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10	CC11	CC12	CC13	CC14	CC15	CC16	CC17	CC18	CC19	CC20	CC21	CC22	CC23	CC24	CC25	CC26	CC27	CC28	CC29	
GC1	+			+			+			+			+																	
GC2	+			+	+		+			+		+	+		+			+												
GC3				+		+																								
GC4		+																												
GC5																+								+		+	+	+	+	
GC6		+					+				+																			
GC7																											+	+	+	
GC8																							+				+	+	+	
GC9			+							+																				
GC10	+		+			+	+	+	+	+																				
SC1												+	+		+			+		+				+						
SC2																							+							+
SC3											+	+		+	+		+			+				+	+	+				
SC4													+					+			+		+				+	+	+	
SC5														+		+	+		+		+					+				
SC6																							+							+
SC7					+																	+				+		+	+	
SC8																										+				
SC9														+			+					+	+			+				+

5. Matrix of accordance of learning outcomes specified by the standards to educational program components

	CC1	CC2	CC3	CC4	CC5	CC6	CC7	CC8	CC9	CC10	CC11	CC12	CC13	CC14	CC15	CC16	CC17	CC18	CC19	CC20	CC21	CC22	CC23	CC24	CC25	CC26	CC27	CC28	CC29
LO1	+	+	+	+		+	+	+	+	+	+	+	+		+			+		+				+					
LO2	+	+	+	+	+	+	+			+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
LO3	+	+	+	+	+	+										+						+	+			+	+	+	+
LO4													+						+			+					+	+	+
LO5																						+							+
LO6														+		+	+		+		+								
LO7		+					+				+		+				+												
LO8											+	+	+	+	+		+	+	+	+	+	+		+	+	+	+	+	+
LO9											+	+		+	+					+				+	+	+			
LO10																							+						+
LO11																										+			
LO12																					+								+
LO13														+								+				+			+