Англійська версія

Ministry of Science and Education of Ukraine

V. N. Karazin Kharkiv National University

Educational and Professional Program

«Cartography, Geoinformatics and Cadastre»

first (bachelor) level of higher education

Field of knowledge 10 Natural Sciences

Specialty 106 Geography

APPROVED
by the Academic Council
of V. N. Karazin Kharkiv National University
on "27" 05 2024
protocol No. 10

Put into force from the 2024/2025 academic year

Order of 29.05. 2024 № 0114-1/178

Vice Rector for Research and Teaching

Oleksandr HOLOVKO

Kharkiv 2024

CONSENT SHEET

of the educational and professional program

«Cartography, Geoinformatics and Cadastre»

The educational program was considered and approved by:

1. Research and Methodological Council of V. N. Karazin Kharkiv National University
protocol No. 8 of «21» 05 2024

Head of the Research and
Methodological Council _____ Oleksandr HOLOVKO

2. Academic Council of the School of Geology, Geography, Recreation and Tourism:
protocol No. 4 of «15» April 2024

Head of the Academic Council
of the School _____ Vilina PERESADKO

3. Research and Methodological Committee of the School of Geology, Geography, Recreation and Tourism:
protocol No. 4 of «15» April 2024

Head of the Research and
Methodological Committee of the School _____ Oleksandr ZHEMEROV

4. Department of Physical Geography and Cartography:
protocol No. 14 of «08» April 2024

Head of the Department,
PhD in Geography, Associate Professor _____ Anatolii BAINAZAROV

PREAMBLE

Developed by a working group consisting of:

Full name	Job title	Academic degree, academic title
Head of the working group – the guarantor of the educational program POPOVYCH Nataliia Valeriivna	Associate professor of HEI of the Department of Physical Geography and Cartography	PhD in Geography
Members of the working group		
PERESADKO Vilina Anatoliivna	Dean of the School of Geology, Geography, Recreation and Tourism, full professor of HEI of the Department of Physical Geography and Cartography	Doctor of Sciences (Geography), full professor by the Department of Physical Geography and Cartography
ZHEMEROV Oleksandr Olehovych	Full professor of HEI of the Department of Physical Geography and Cartography	PhD in Geography, associate professor by the Department of Physical Geography and Cartography
PRASUL Yuliia Ivanivna	Associate professor of HEI of the Department of Physical Geography and Cartography	PhD in Geography, associate professor by the Department of Physical Geography and Cartography
BUBYR Natalia Oleksandrivna	Associate professor of HEI of the Department of Physical Geography and Cartography	PhD in Geography, associate professor by the Department of Physical Geography and Cartography
SINNA Olena Ivanivna	Associate professor of HEI of the Department of Physical Geography and Cartography	PhD in Geography
POPOV Vladyslav Serhiiovych	Head of the GIS and Remote Sensing Laboratory	

The following people were involved in the development of the educational program:

Representatives of students:

KOSTYRENKO Ilona Serhiivna – student of the first (bachelor's) level of higher education of the Cartography, Geoinformatics and Cadastre educational program, student of the Department of Physical Geography and Cartography, group GK-31;
ISKANDAROV Illia Oleksiiovych – graduate of the first (bachelor's) level of higher education of the Cartography, Geoinformatics and Cadastre educational program, student of the Department of Physical Geography and Cartography, group GK-41;
NAZARENKO Yuliia Mykhailivna – student of the second (master's) level of higher education of the Cartography, GIS and Earth Remote Sensing educational program, student of the Department of Physical Geography and Cartography, group GD-11.

Representatives of employers:

VARVANSKYI Volodymyr Mykolaiovych, commercial director of the LLC «Heopraktyk»;
SELIVERSTOV Oleh Yuriiovych, IT consultant (private entrepreneur);
SOBOLIEV Maksym Borysovych, head of the geodetic department of the LLC «Zemstroiproekt».

When developing the Program project, the following requirements have been considered:

1) Educational standard of the specialty

Standard of higher education in the specialty 106 «Geography», field of knowledge 10 «Natural sciences» for the first (Bachelor) level of higher education approved by the Order of the Ministry of Education and Science of Ukraine No. 805 of 16.06.2020 as amended by the Order of the Ministry of Education and Science of Ukraine No. 593 of 28.05.2021

2) Professional standard (s) _____
name of the standard, owner/provider of the standard

_____

3) Professional association recommendations _____
name

_____
information on placement/publication of recommendations

4) Recommendations of a leading employer in the industry _____
name

_____
information on placement/publication of recommendations

1. Profile of the educational and professional program
«Cartography, Geoinformatics and Cadastre»
in the specialty 106 «Geography»

1 – General information	
Full name of the educational institution and structural subdivision	V. N. Karazin Kharkiv National University, School of Geology, Geography, Recreation and Tourism
Official name of the educational program	Cartography, Geoinformatics and Cadastre
Degree of higher education	Bachelor
Name of the qualification	Bachelor of Geography, Cartography, Geoinformatics and Cadastre
Type of diploma and the volume of the educational program	unitary, 240 ECTS credits, term of study 3 years 10 months
Availability of accreditation	Decision of the National Agency for Higher Education Quality Assurance in accordance with the Resolution of the Cabinet of Ministers of Ukraine No. 295 of 16.03.2022, certificate of conditional (delayed) accreditation No. 7514, protocol No. 9 (59) of 16.04.2024
Prerequisites	Complete general secondary education. Admission on the basis of the degrees «junior bachelor», «professional junior bachelor» or educational qualification level «junior specialist» is carried out based on the results of the External independent testing in the manner prescribed by the legislation
Language of instruction	Ukrainian, English
Duration of the educational program	4 years
Internet address of the permanent placement of the description of the educational program	*https://geo.karazin.ua/opp2024/*
2 – The aim of the educational program	
is to provide theoretical and practical training of highly qualified personnel who would acquire basic professional knowledge to perform professional tasks and duties of an applied nature in the field of modern geographical science, cartography, geoinformatics and cadastre.	
3 – Characteristics of the educational program	
Subject area (field of knowledge,	10 Natural Sciences 106 Geography

specialty)	
Orientation of the educational program	Educational and professional, applied. Professional emphasis – a geographer with enhanced training in cartography, geoinformatics and cadastre.
Main focus of the educational program and specialization	Basic higher education in the field of knowledge 10. Natural sciences with the specialty 106. Geography. Formation of a professional with a modern scientific worldview and thinking, who mastered modern geoinformational and cartographic technologies and knows how to apply them, relying on in-depth geographical knowledge. Keywords: geography, cartography, geoinformatics, cadastre, Earth remote sensing, geographic information systems (GIS).
Special features of the educational program	Interdisciplinary and multidisciplinary training of specialists, knowledge and mastery of modern geoinformation technologies for solving experimental and practical tasks based on fundamental knowledge in the field of geography, enhanced practical training, including field research, possible academic mobility and internship in educational institutions abroad.
4 – Graduates' suitability for employment and further education	
Suitability for employment	Professional activity at firms, enterprises, in departments specializing in the field of geoinformatics, cartography, cadastre, topographic works and surveying, as a GIS specialist in institutions of geographic and related profiles. Employment opportunities in the fields related to modern information technologies. Primary positions: cartographer, GIS specialist, geocoder, surveyor, land management specialist (code KP 3118), Laboratory technician of the scientific unit (other areas (fields) of scientific research) (code KP 3491).
Further education	Further studies at the second (for educational and professional or educational and scientific programs) – 7th qualification level of the NQF. Acquisition of partial qualifications in other specialties in the system of higher education, further professional development.
5 – Teaching and assessment	
Teaching and learning	The acquisition of general and professional competence is provided by a complex combination of compulsory disciplines and special (professional) courses, educational and industrial practices, bachelor's thesis. Education is student-centered, problem-oriented according to the principle «learning while researching», the implementation of which involves the maximum development of abilities and skills through the practical training and research work of students. Active (problematic, interactive, project, information-computer, self-developing) and passive (explanatory and illustrative) technologies and methods. Methods and technologies of geographic sciences (field research and processing of geographic information with the use of information technologies,

	geoecological studies, system-structural method, cluster analysis, cartographic method).
Assessment	Four-level and two-level, 100-point assessment system through the following types of control with the accumulation of points: *current* (tests, oral and written survey during lectures), intermediate (defense of laboratory wors, practical assignments, projects, seminar classes), *final* (written exams (mainly in test form), credit works, defense of practice reports, defense of course work), self-monitoring, *attestation* (qualifying exam, preparation and public defense of a bachelor's thesis).
6 – Program competence	
Integral competence	The ability to solve complex specialized tasks and practical problems characterized by the complexity and uncertainty of conditions in professional activities in geography or in the learning process using modern theories and research methods of natural and social objects and processes.
General Competence (GC)	**GC 1.** The ability to apply knowledge in practical situations. **GC 2.** Knowledge and understanding of the subject area and understanding of professional activity. **GC 3.** The ability to communicate in the national language both orally and in writing. **GC 4.** The ability to communicate in a foreign language. **GC 5.** Skills in using information and communication technologies. **GC 6.** The ability to conduct research at a relevant level. **GC 7.** The ability to search, process and analyze information from various sources. **GC 8.** Interpersonal skills. **GC 9.** The ability to work independently. **GC 10.** Skills of performing safe activities. **GC 11.** The ability to realize one's rights and responsibilities as a member of the society, to realize the values of a civil (free democratic) society and the need for its sustainable development, the rule of law, the rights and freedoms of a person and a citizen in Ukraine. **GC 12.** The ability to preserve and multiply moral, cultural, scientific values and achievements of the society based on understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies, to use different types and forms of physical activity for active recreation and leading a healthy lifestyle. **GC 13.** The aim to preserve and protect the natural environment, rational use of natural resources.
Professional competence	**PC 1.** The ability to participate in the planning and implementation of research and technical projects.

of the specialty (PC)	**PC 2.** The ability to apply knowledge and understanding of the main characteristics, processes, history and composition of nature and society. **PC 3.** The ability to collect, record and analyze data using appropriate methods and technological and software tools in field and laboratory conditions. **PC 4.** The ability to apply quantitative methods in the study of the spheres of the landscape shell. **PC 5.** The ability to analyze the composition and structure of geospheres (in accordance with the specialization) on different spatial and temporal scales. **PC 6.** The ability to integrate field and laboratory observations with theory in a sequence: from observation to recognition, synthesis and modeling. **PC 7.** Knowledge and use of theories, paradigms, concepts and principles specific to geographic sciences in accordance with the specialization. **PC 8.** Independent research of natural materials and statistical data (in accordance with the specialization) in field and laboratory conditions, to describe, analyze, document and present the results. **PC 9.** The ability to plan and conduct research and prepare reports. **PC 10.** The ability to identify and classify known and register new objects in the geographical shell, their special features and processes. **PC 11.** The ability to work in professional teams, including those in interdisciplinary projects. **PC 12.** The ability to demonstrate system geographic thinking. **PC 13.** Understanding the cause-and-effect relationships of development and interaction between nature and society and the ability to use it in professional, social, and pedagogical activities. **PC 14.** The ability to apply basic knowledge of fundamental sciences when studying natural and anthropogenic geosystems of different hierarchical levels. **PC 15.** Cartographic competence: the ability to provide a comprehensive geographic assessment of the territory based on the results of map analysis, the ability to display geographic objects and processes using cartographic works. **PC 16.** The ability to use geographic information technologies to solve practical tasks in the field of geography.
7 – Program learning outcomes	
	PLO 1. To know, understand and be able to use in practice the basic concepts of the theory of geography, as well as worldview sciences. **PLO 2.** To know and understand the main types of geographical activity, their division.

	PLO 3. To explain the special features of the organization of the geographical space. **PLO 4.** To analyze the geographical potential of the area. **PLO 5.** To collect, process and analyze information in the field of geographical sciences. **PLO 6.** To use information technologies, cartographic and geoinformational models in the field of geographical sciences. **PLO 7.** To determine the main characteristics, processes, history and composition of the landscape shell and its components. **PLO 8.** To apply models and methods of physics, chemistry, geology, ecology, mathematics, information technologies, etc. when studying natural and social processes of formation and development of geospheres. **PLO 9.** To analyze the composition and structure of natural and sociospheres (in accordance with the specialization) on different spatial and temporal scales. **PLO 10.** To know the goals of sustainable development and the possibilities of one's professional sphere to achieve them, including in Ukraine. **PLO 11.** To adhere to moral and ethical aspects of research, honesty, professional code of conduct. **PLO 12.** To understand the geographical basis of rational nature use and nature protection. **PLO 13.** To be able to participate in the certain types of field geographical research. **PLO 14.** To apply methods and techniques of analysis of genesis, evolution and development trends of objects and environmental phenomena. **PLO 15.** To analyze and evaluate the impact of geographic features of regions on nature use and economic activity. **PLO 16.** To determine changes in the characteristics of the natural environment under the influence of economic activity. **PLO 17.** To be able to communicate with representatives of other professional groups, including those in general and specialized educational institutions.
8 – Resource support for the program implementation	
Specific characteristics of personnel support	All teachers are full-time teachers of V. N. Karazin Kharkiv National University, have scientific and professional activities that correspond to the main profile of the discipline. All teachers undergo advanced training every five years.
Specific characteristics of material and technical support	Equipment necessary for field / laboratory / remote research of the composition, structure and properties of the geographic shell, its components (theodolites, levels, compasses, kipregels, aneroid barometers; GPS navigator; GPS receiver, heliograph, psychrometers, thermographs, weather vane, hygrograph, balance meter, actinometers, anemometers, anemorumbometers,

	thermometers, snow gauge, barograph, bathometer, galvanometer, thermometer-probe, rain gauge; automatic weather station, wind turbine; automatic anemorumbometer, solar batteries, sounder, laser range finder), technical teaching aids (boards screens; multimedia projectors, laptops, printers; scanners, personal computers with the software) for the formation of subject competencies in geography during student's studies; bases for educational and industrial practices in specialized companies and institutions (according to cooperation agreements). There are classrooms, laboratories, computer classrooms, dormitory, food courts, Internet access, gyms, etc. It corresponds to the licensing conditions for conducting educational activities.
Specific characteristics of information and educational and methodological support	Official web-sites of V. N. Karazin Kharkiv National University (https://karazin.ua/), the School of Geology, Geography, Recreation and Tourism (https://geo.karazin.ua/), the Department of Physical Geography and Cartography (http://physgeo.univer.kharkov.ua/) contain information about educational and research activity, structural subdivisions, admission rules, contacts, educational resources (educational and methodological support materials). Unlimited access to the Internet, printed (funds of the National Central Library of V. N. Karazin Kharkiv National University, repository, own libraries of educational laboratories, database of space and aerial photographs, cartographic works) and Internet sources (including the Center for Electronic Learning of Karazin University) of information; study and work plans, educational programs, syllabuses of disciplines and practical trainings, educational and methodological complexes of disciplines, including lecture material, tasks of practical assignments, questions of seminar classes, tasks for independent work, questions and tasks examples for current and final control. It corresponds to the licensing conditions for conducting educational activities.
9 – Academic mobility	
National credit mobility	It is possible, individual, under bilateral agreements between V. N. Karazin Kharkiv National University and other universities of Ukraine
International credit mobility	It is possible, individual, under bilateral agreements between V. N. Karazin Kharkiv National University and international partner universities
Training of foreign higher education students	According to the admission rules

2. Components list of the educational and professional program and their logical consistency

Code	Components of the educational program (educational disciplines, course projects (works), practical training, qualifying exam, graduation thesis)	Number of credits	Final assessment form
1	2	3	4
1. Compulsory components of the EP			
CC 1	History of Ukraine: the Civilizational Dimension	3	exam
CC 2	Higher Mathematics	4	credit
CC 3	Physics	4	credit
CC 4	Professional Foreign Language	12	exam
CC 5	Computer Science with the Basics of Geoinformatics	5	exam
CC 6	Philosophy	3	exam
CC 7	Introduction to the Specialty	4	credit
CC 8	General Earth Science	5	exam
CC 9	Soil Science and Biogeography	6	exam
CC 10	Topography with the Basics of Geodesy	5	exam
CC 11	General Geology	4	credit
CC 12	Meteorology and Climatology	4	exam
CC 13	General Hydrology	4	exam
CC 14	Fundaments of Human Geography	4	exam
CC 15	Geomorphology and Paleogeography	4	exam
CC 16	Cartography	4	exam
CC 17	Physical Geography of Continents and Oceans	7	credit, exam
CC 18	Earth Remote Sensing	3	credit
CC 19	Landscape Studies	4	exam
CC 20	Population and Settlement Geography	4	exam
CC 21	GIS in Geography	3	credit
CC 22	Fundamentals of Geoecology	3	exam
CC 23	Regional Economic and Social Geography	8	credit, exam
CC 24	Statistical Methods and Processing of Geoinformation	4	exam
CC 25	Historical Geography with the Basics of Ethnography	4	exam
CC 26	Geography of Service Industry and Tourism	5	exam
CC 27	Fundamentals of Land Management	4	exam
CC 28	Workshop on Cartography, Geoinformatics, Geodesy and Cadastre	8	credit, exam
CC 29	Cartographic Research Method	4	exam
CC 30	Sectoral Cadasters of Ukraine	4	credit
CC 31	Analysis of Earth Remote Sensing Data	6	exam

CC 32	Educational Natural and Scientific Practice	8	exam
CC 33	Educational Professional-Oriented Practice	6	exam
CC 34	Industrial Practice	7	credit
CC 35	Course Project	3	exam
CC 36	Pre-Diploma Practice	5	exam
CC 37	Graduation Thesis	3	exam
CC 38	Qualifying Geography Exam		exam
Total volume of compulsory components		**178**	
2. Elective components of the EP			
2.1. Cycle of general training *4 disciplines are chosen according to the catalog of interfaculty disciplines of the university (at least out of 200) with a total volume of 12 ECTS*			
EC 2.1.1	Interfaculty Selective Discipline 1	3	credit
EC 2.1.2	Interfaculty Selective Discipline 2	3	credit
EC 2.1.3	Interfaculty Selective Discipline 3	3	credit
EC 2.1.4	Interfaculty Selective Discipline 4	3	credit
2.2. Cycle of professional training			
EC 5	Basics of Computer Technologies / Computer Graphics	4	exam
EC 6	Recreational Geography / Land Management / General and Age Phychology / Pedagogy	3	credit
EC 7	Physical Geography of Ukraine / Geographical Environment of Ukraine	5	exam
EC 8	GIS Modeling in Renewable Energy / Database Structures / Geology of Oil and Gas	4	exam
EC 9	Economic and Social Geography of Ukraine / Ethnogeography of Ukraine / Socio-Spatial Organization of Ukraine	4	exam
EC 10	Basics of Scientific Research / Organization of Research Work in Geography / Geography Teaching Methodology	4	exam
EC 11	Basics of Photogrammetry and 3D modeling / Topographic Mapping in GIS / Geography of the World Economy and International Trade	4	credit
EC 12	Computer Modeling in Geology / Anthropogenic Landscapes / Geographic Information Systems	4	exam
EC 13	Geodatabases and the Basics of Programming in GIS / Global Changes in the Nature of the Earth / Map Design	8	credit, exam
EC 14	Cartographic Workshop in the Workplace /	6	credit

	Pedagogical Practice		
EC 15	Geoecological Expertise of the Territories / Earth's Climate / Organization of Fieldwork in Geography / Geography Teaching Theory	4	credit
Total volume of elective components		**62**	
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		**240**	

3. Structural and logical scheme of the EP

Semester	Components of the educational program	Number of credits
1	History of Ukraine: the Civilizational Dimension	3
	Higher Mathematics	4
	Introduction to the Specialty	4
	General Earth Science	5
	Soil Science and Biogeography	6
	Topography with the Basics of Geodesy	5
	Professional Foreign Language	3
	Total for semester 1	*30*
2	Professional Foreign Language	2
	Physics	4
	General Geology	4
	Meteorology and Climatology	4
	General Hydrology	4
	Fundaments of Human Geography	4
	Educational Natural and Scientific Practice	8
	Total for semester 2	*30*
3	Professional Foreign Language	2
	Computer Science with the Basics of Geoinformatics	5
	Geomorphology and Paleogeography	4
	Cartography	4
	Physical Geography of Continents and Oceans	5
	Earth Remote Sensing	3
	Interfaculty Selective Discipline*	3
	Basics of Computer Technologies / Computer Graphics*	4
	Total for semester 3	*30*
4	Philosophy	3
	Professional Foreign Language	2
	Physical Geography of Continents and Oceans	2
	Landscape Studies	4
	Population and Settlement Geography	4
	GIS in Geography	3
	Interfaculty Selective Discipline*	3

	Recreational Geography / Land Management / General and Age Phychology / Pedagogy*	3
	Educational Professional-Oriented Practice	6
	Total for semester 4	*30*
5	Professional Foreign Language	1,5
	Fundamentals of Geoecology	3
	Regional Economic and Social Geography	5,5
	Interfaculty Selective Discipline*	3
	Physical Geography of Ukraine / Geographical Environment of Ukraine*	5
	GIS Modeling in Renewable Energy / Database Structures / Geology of Oil and Gas*	4
	Economic and Social Geography of Ukraine / Ethnogeography of Ukraine / Socio-Spatial Organization of Ukraine*	4
	Basics of Scientific Research / Organization of Research Work in Geography / Geography Teaching Methodology*	4
	Total for semester 5	*30*
6	Professional Foreign Language	1,5
	Regional Economic and Social Geography	2,5
	Statistical Methods and Processing of Geoinformation	4
	Historical Geography with the Basics of Ethnography	4
	Interfaculty Selective Discipline*	3
	Basics of Photogrammetry and 3D modeling / Topographic Mapping in GIS / Geography of the World Economy and International Trade*	4
	Computer Modeling in Geology / Anthropogenic Landscapes / Geographic Information Systems*	4
	Industrial Practice	7
	Total for semester 6	*30*
7	Geography of Service Industry and Tourism	5
	Fundamentals of Land Management	4
	Workshop on Cartography, Geoinformatics, Geodesy and Cadastre	4
	Cartographic Research Method	4
	Course Project	3
	Geodatabases and the Basics of Programming in GIS / Global Changes in the Nature of the Earth / Map Design*	4
	Cartographic Workshop in the Workplace / Pedagogical Practice*	6
	Total for semester 7	*30*
8	Sectoral Cadasters of Ukraine	4
	Workshop on Cartography, Geoinformatics, Geodesy and Cadastre	4
	Analysis of Earth Remote Sensing Data	6

	Geodatabases and the Basics of Programming in GIS / Global Changes in the Nature of the Earth / Map Design*	4
	Geoecological Expertise of the Territories / Earth's Climate / Organization of Fieldwork in Geography / Geography Teaching Theory*	4
	Pre-Diploma Practice	5
	Graduation Thesis	3
	Qualifying Geography Exam	
	Total for semester 8	*30*
	Total for the educational program	***240***

* the list of elective disciplines is indicative and may change in accordance with the current requests of the field of cartography, geoinformatics and cadastre

4. Attestation form of higher education students

Attestation of graduates of the educational and professional program «Cartography, Geoinformatics and Cadastre» of the specialty 106 «Geography» is conducted in the form of a qualifying exam and defense of the bachelor's thesis and ends with the issuance of a document of the established model awarding a graduate a bachelor's degree with the qualification: Bachelor of Geography, Cartography, Geoinformatics and Cadastre.

A bachelor's thesis is a completed scientific research that involves the solution of a specialized geographical task, must have internal unity and testify to the student's readiness to perform professional duties using the acquired integrated knowledge and practical skills. The thesis involves a literature review, analysis and applied research with the use of acquired knowledge and modern technologies of cartography, geoinformatics and cadastre based on the materials collected during practical training and processed in laboratory conditions. The thesis is checked for the academic plagiarism in accordance with the procedure defined by the higher education institution's system of ensuring the quality of educational activities and the quality of higher education. Attestation is carried out openly and publicly in front of the Examination Commission, which is approved by the Order of the Rector of V. N. Karazin Kharkiv National University. The student's report must be accompanied by a multimedia presentation for persuasiveness and confirmation of conclusions and proposals.

The qualifying exam involves the assessment of learning outcomes determined by the approved Standard of higher education in the specialty 106 «Geography» and the educational program.

5. Compatibility matrix of the program competence with the components of the educational program

	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	CC30	CC31	CC32	CC33	CC34	CC35	CC36	CC37	CC38
GC1		•	•		•	•				•		•	•		•	•		•		•	•	•		•		•	•	•	•	•	•	•	•	•	•	•	•	•
GC2							•	•	•		•	•	•	•	•	•	•	•	•		•					•	•	•		•				•					
GC3	•					•	•																									•	•	•	•	•	•	•
GC4				•																																		
GC5		•			•											•		•			•			•			•	•	•		•							
GC6				•																												•	•		•	•	•	
GC7	•			•		•	•										•	•		•	•	•		•			•	•	•	•	•	•	•	•	•	•	•	
GC8				•		•																										•	•	•				
GC9																												•						•	•	•	•	•
GC10			•																								•				•	•	•				
GC11	•					•																			•													
GC12	•					•	•							•											•	•												
GC13																				•		•							•									
PC1																																•	•		•	•	•	
PC2								•	•		•	•	•	•	•		•		•	•			•		•	•						•	•					•
PC3					•					•		•						•	•		•	•		•			•	•	•	•	•	•	•	•				
PC4		•	•								•		•							•		•		•														
PC5			•					•	•	•	•	•	•		•		•	•	•		•		•								•							
PC6			•						•	•						•																						
PC7								•	•		•		•	•	•				•	•			•		•	•												•
PC8		•			•				•			•			•	•	•				•			•					•					•	•	•	•	
PC9																																•	•	•	•	•	•	
PC10								•	•	•	•	•	•	•	•	•	•	•	•		•					•	•	•		•	•				•	•	•	
PC11			•	•																		•		•	•							•	•	•				
PC12								•									•		•	•			•									•	•					
PC13								•			•			•			•			•		•	•		•	•	•			•								
PC14		•	•					•				•	•																			•	•					
PC15					•					•					•	•	•	•	•		•						•	•	•									
PC16					•					•						•		•			•						•	•	•		•							

6. Support matrix of the program learning outcomes (PLO) by the relevant components of the educational program

	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	CC30	CC31	CC32	CC33	CC34	CC35	CC36	CC37	CC38
PLO1	•					•	•	•				•	•	•	•				•												•						•
PLO2							•			•																•	•	•				•		•				
PLO3								•	•					•			•	•	•												•			•	•	•	•
PLO4														•			•												•		•						
PLO5				•						•						•		•			•			•			•	•	•	•	•	•	•	•	•	•	
PLO6					•					•						•		•			•			•			•	•	•		•		•				
PLO7			•					•	•		•	•	•		•		•		•										•								
PLO8		•	•		•						•	•									•			•	•				•		•						
PLO9									•				•	•	•				•	•			•			•							•					•
PLO10	•						•													•		•	•			•	•			•								
PLO11				•		•																						•						•	•	•	•	•
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PLO13									•	•																		•				•	•					
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PLO15														•			•			•		•	•		•	•	•			•							
PLO16								•	•				•		•		•		•	•		•	•							•								
PLO17	•	•	•	•	•	•	•																	•	•		•	•						•				