MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY
TECHNOLOGY AND DESIGN

APPROVED BY THE SCIENTIFIC COUNCIL
Chairman of the Academic Council of KNUTD

_____ Ivan GRISHCHENKO

(Minutes of "___" _____ 20__ № ___)

EDUCATIONAL AND PROFESSIONAL PROGRAM

APPLIED MECHANICS

Level of higher education first (bachelor's)

Degree of higher education Bachelor

Field of knowledge Mechanical engineering

Specialty131 Applied Mechanics

Qualification Bachelor of Applied Mechanics

Kyiv 2021

LETTER OF APPROVAL

Educational and professional program
APPLIED MECHANICS

Level of higher education _____ first (bachelor's) _____

Degree of higher education_____bachelor_____

Field of knowledge_____13 Mechanical engineering_____

Specialty_____131 Applied Mechanics_____

Vice-rector for scientific and pedagogical activities (educational activities)

_____ _____ Oksana MORGULETS
(date) (signature)

Approved by the Academic Council of the Faculty of Mechatronics and Computer Technology

Minutes of "19" __April ___ 2021 № 12

Dean of the Facultymechatronics and computer technology

_____ _____ Vladimir PAVLENKO
(date) (signature)

Discussed and recommended at the meeting of the departmentapplied mechanics and machines

Minutes of "09" __April__ 2021 № 9

Head of Departmentapplied mechanics and machines

_____ _____ Aleksander MANOILENKO
(date) (signature)

Guarantor of the educational program

_____ _____ Aleksander MANOILENKO
(date) (signature)

Put into effect by the order of KNUTD from "___" _____ 20__ year № ___.

PREFACE

DEVELOPED: Kyiv National University of Technology and Design

DEVELOPERS:

Guarantor of the educational program Manoilenko Aleksander Petrovich, Ph.D., Associate Professor, Associate Professor of Applied Mechanics and Machines, Kyiv National University of Technology and Design

Members of the working group:

Rubanka Mykola Mykolayovych, Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Applied Mechanics and Machines, Kyiv National University of Technology and Design;

Kovalev Yuriy Adislavovych, Candidate of Technical Sciences, Associate Professor, Associate Professor of the Department of Applied Mechanics and Machines of the Kyiv NationalUniversity of Technology and Design;

Chabanova Yuliya Vladislavivna, student of the Faculty of Mechatronics and Computer Technologies of the Kyiv NationalUniversity of Technology and Design.

REVIEWS OF EXTERNAL STAKEHOLDERS:

1) Selivonchyk IS, General Director of MTK LLC, Ph.D.;
2) Trunov DA, Director of Technopolis Engineering Company;
3) Egorov VV, Director of Legpromengineering LLC, Ph.D.;
4) Doshchenko MA, Director of LLC "MR ENGINEERING";
5) Korchak VP, Director of PJSC TEXTEMP;
6) Nenno DO, design engineer of SELTON LLC;
7) Ivanova LI, Director of DANA-FASHION LLC;
8) Abasova OS, director of the knitting factory of 42 DAY LLC, Kyiv;
9) Shcherban Yu.Yu., Deputy Director of the Kyiv Professional College of Applied Sciences, Doctor of Technical Sciences, Professor.

1.Profile of the educational and professional program Applied Mechanics

1 - General information	
Full name of the institution of higher education and structural unit	Kyiv National University of Technology and Design Department of Applied Mechanics and Machines
Degree of higher education and qualification in the original language	The level of higher education is the first (bachelor's). Degree of higher education - bachelor. Field of knowledge - 13 Mechanical Engineering. Specialty - 131 Applied Mechanics. Educational program - Applied Mechanics.
Type of diploma and scope of educational program	Bachelor's degree, single, 240/180 ECTS credits.
Availability of accreditation	Certificate of accreditation of the educational program from 11.07.2018 UD №11002996
Cycle / level	National Qualifications Framework of Ukraine - level 6.
Prerequisites	Complete general secondary education, professional higher education or a bachelor's degree.
Language (s) of instruction	Ukrainian
Term of the educational program	Until July 1, 2023
Internet address of the permanent post of the description of the educational program	http://knutd.edu.ua/ekts/
2 - The purpose of the educational program	
Formation and development of general competencies andprofessional engineering activities in the field of design and operation of technical systems, machines and equipment, robotic means and automated equipment for light industry. The main objectives of the program are to train professionals who are able to develop innovative solutionsand have the basics of designing typical mechanisms of technological machines of light industry, robotic devices and their components, including electronics and mechanics (mechatronics), transport and logistics, robotic systemsautomated equipment of light industry,using modern tools and tools of automated design, engineering analysis and programming basics.	
3 - Characteristics of the educational program	
Subject area	The program is focused on the formation of applicants for competencies to acquire deep knowledge, skills and abilities in the specialty. Compulsory educational components - 75%, of which: general training - 35%, vocational training - 32%, practical training - 13%, learning a foreign language - 13%, diploma design - 7%. Disciplines of free choice of students - 25% are selected from the university catalog in accordance with the approved procedure at the University.
Orientation of the educational program	Educational and professional program for bachelor's degree.
The main focus of the educational program	Emphasis is placed on the formation and development of professional competencies in the fields of applied mechanics in the field of light industry and mechanical engineering; instudiestechnical, mathematical, informational, software of mechanical systems aimed at the development, research and implementation in the production of design documentation, structures, machines, mechanisms, equipment, mechanical systems and complexes.
Features of the educational program	Educational and professionalThe program develops theoretical and practical training in the field of design, manufacture and operation of technical systems, machinery and equipment, robotic means and light industry complexes.

4 - Suitability of graduates for employment and further study		
Suitability for employment	The graduate is suitable for employment in light industry, installation, repair and maintenance services, organizational and management services, research institutes and laboratories, design bureaus, commercial firms selling technological equipment and machinery, advertising agencies of similar profile , automated warehouses. Professional titles of works that can be performed by the applicant:mechanic, production mechanic, equipment repair mechanic, handling machine mechanic, shop mechanic, debugging mechanic, production process automation technician, equipment maintenance and repair technician, tool technician, labor-intensive mechanization technician, design technician (mechanic) , technician-technologist (mechanics), copyist of technical documentation, draftsman, draftsman-designer, instructor on operational, production-technical and organizational issues, laboratory assistant (technical field), debugging and testing technician, training technicianproduction, technicians for the preparation of technical documentation.	
Further training	Opportunity to study according to the educational-professional, educational-scientific program of the second (master's) level of higher education.	
5 - Teaching and assessment		
Teaching and learning	Student-centered and problem-oriented learning, learning through educational, industrial, undergraduate practice and self-study are used. The system of teaching methods is based on the principles of purposefulness, binary - active direct participation of research and teaching staff and students of higher education. Forms of organization of the educational process: lecture, seminar, practical, laboratory classes, practical training, independent work, consultation, development of professional projects (works).	
Evaluation	Testing, oral presentations, reports on laboratory work, reports on practice, tests, course (project) work, oral and written exams.	
6 - Program competencies		
Integral competence(IR)	Ability to solve complex specialized problems and practical problems in applied mechanics or in the learning process, which involves the use of certain theories and methods of mechanical engineering and is characterized by complexity and uncertainty of conditions.	
General competencies (GC)	GC 1	Ability to abstract thinking, analysis and synthesis.
	GC 2	Knowledge and understanding of the subject area and understanding of professional activity.
	GC 3	Ability to identify, pose and solve problems.
	GC 4	Ability to apply knowledge in practical situations.
	GC 5	Ability to work in a team.
	GC 6	Definiteness and persistence in terms of tasks and responsibilities.
	GC 7	Ability to learn and master modern knowledge.
	GC 8	Ability to communicate in a foreign language.
	GC 9	Skills in the use of information and communication technologies.
	GC 10	Safe skills.
	GC 11	Ability to act socially responsibly and consciously.
	GC 12	Ability to search, process and analyze information from various sources.
	GC 13	Ability to evaluate and ensure the quality of work performed.
	GC 14	Ability to exercise their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.

	GC 15	Ability to preserve and increase moral, cultural, scientific values and achievements of society based on understanding 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. active recreation and healthy living.
Professional competencies (PC)	PC 1	Ability to analyze materials, structures and processes based on laws, theories and methods of mathematics, natural sciences and applied mechanics
	PC 2	Ability to evaluate the performance parameters of materials, structures and machines in operating conditions and find appropriate solutions to ensure a given level of reliability of structures and processes, including in the presence of some uncertainty.
	PC 3	Ability to conduct technological and technical and economic assessment of the effectiveness of new technologies and technical means.
	PC 4	Ability to make the optimal choice of technological equipment, equipment of technical complexes, to have a basic idea of the rules of their operation.
	PC 5	Ability to use analytical and numerical mathematical methods to solve problems of applied mechanics, in particular to calculate the strength, endurance, stability, durability, stiffness in the process of static and dynamic loading to assess the reliability of parts and structures of machines.
	PC 6	Ability to perform technical measurements, obtain, analyze and critically evaluate measurement results.
	PC 7	Ability to use computer-aided design (CAD), manufacturing (CAM), engineering research (CAE) and specialized application software to solve engineering problems in applied mechanics.
	PC 8	Ability to spatial thinking and reproduction of spatial objects, structures and mechanisms in the form of projection drawings and three-dimensional geometric models.
	PC 9	Ability to present the results of their engineering activities in compliance with generally accepted norms and standards.
	PC 10	Ability to describe and classify a wide range of technical objects and processes, based on deep knowledge and understanding of basic mechanical theories and practices, as well as basic knowledge of related sciences.
	PC 11	Ability to calculate and design elements of mechanisms of technological machines of light industry.
	PC 12	Ability of computer modeling (CAE) of technological processes of manufacturing light industry products.

7 - Program learning outcomes (PLO)	
Knowledge and understanding:	
PLO 1	know and understand the basics of information technology, programming, practical use of applied software to perform engineering calculations, information processing and experimental research results;
PLO 2	know and understand the basics of applied mechanics in the sections of statics, kinematics and dynamics, theory of mechanisms, mechanics of materials and structural strength;
PLO 3	know and understand related fields (mechanics of liquids and gases, heat engineering, electrical engineering, electronics) and be able to identify interdisciplinary links in applied mechanics at the level required to meet other requirements of the educational

	program;
PLO 4	know the design, methods of selection and calculation, basics of maintenance and operation of drives of machine tools and robotic equipment;
PLO 5	understand the principles of operation of automated control systems of technological equipment, including microprocessor, choose and use the best automation tools.
PLO 6	ability to study the mechanisms, drives of technological machines of light industry.
PLO 7	understand the basics of philosophy, the basics of culturology; basics of social sciences;
PLO 8	ability of computer modeling and research of processes in the manufacture of light industry products using CAE technologies.
Application of knowledge and understanding (skills):	
PLO 9	select and apply suitable mathematical methods to solve problems of applied mechanics;
PLO 10	to use knowledge of theoretical bases of mechanics of liquids and gases, heat engineering and electrical engineering for the decision of professional problems;
PLO 11	perform calculations on the strength, endurance, stability, durability, rigidity of machine parts;
PLO 12	evaluate the reliability of parts and structures of machines in the process of static and dynamic loading;
PLO 13	perform geometric modeling of parts, mechanisms and structures in the form of spatial models and projection images and design the result in the form of technical and working drawings;
PLO 14	create and theoretically substantiate the design of machines, mechanisms and their elements on the basis of methods of applied mechanics, general principles of design, the theory of interchangeability, standard methods of calculating machine parts;
PLO 15	apply regulatory and reference data to control the compliance of technical documentation, products and technologies with standards, specifications and other regulatory documents;
PLO 16	skills of practical use of computer-aided design (CAD), production preparation (CAM) and engineering research (CAE);
PLO 17	evaluate the technical and economic efficiency of production;
PLO 18	to make the optimal choice of equipment and complete set of technical complexes;
PLO 19	take into account in decision-making the main factors of man-made impact on the environment and the main methods of environmental protection, labor protection and safety.
Formation of judgments:	
PLO 20	communicate freely on professional issues orally and in writing in the state and foreign languages, including knowledge of special terminology and interpersonal skills.
PLO 21	is able to demonstrate the acquired knowledge and skills in practical activities and daily life to improve efficiency, maintain and strengthen health, organize and conduct active recreation and participation in sports competitions.

8 - Resource support for program implementation	
Staffing	All scientific and pedagogical workers who provide the educational program on qualification, correspond to a profile and a direction of the educational components which are taught; have the necessary experience of pedagogical work and experience of practical work. In the process of organizing training, professionals with experience in research / management / innovation / creative work and / or work in the specialty are involved.
Logistics	Logistics allows to fully ensure the educational process throughout the training cycle of the educational program. The condition of the premises is certified by sanitary and technical passports that comply with current regulations.
Information and educational and methodological support	The program is fully provided with an educational and methodological complex of all components of the educational program, the availability of which is presented in the modular environment of the educational process of the University.

9 - Academic mobility	
National credit mobility	Provides for the possibility of academic mobility in some components of the educational program, providing the acquisition of general or professional competencies.
International credit mobility	The program develops prospects for participation and internships in research projects and academic mobility programs abroad.
Training of foreign applicants for higher education	Training of foreign applicants for higher education is carried out according to accredited educational programs.

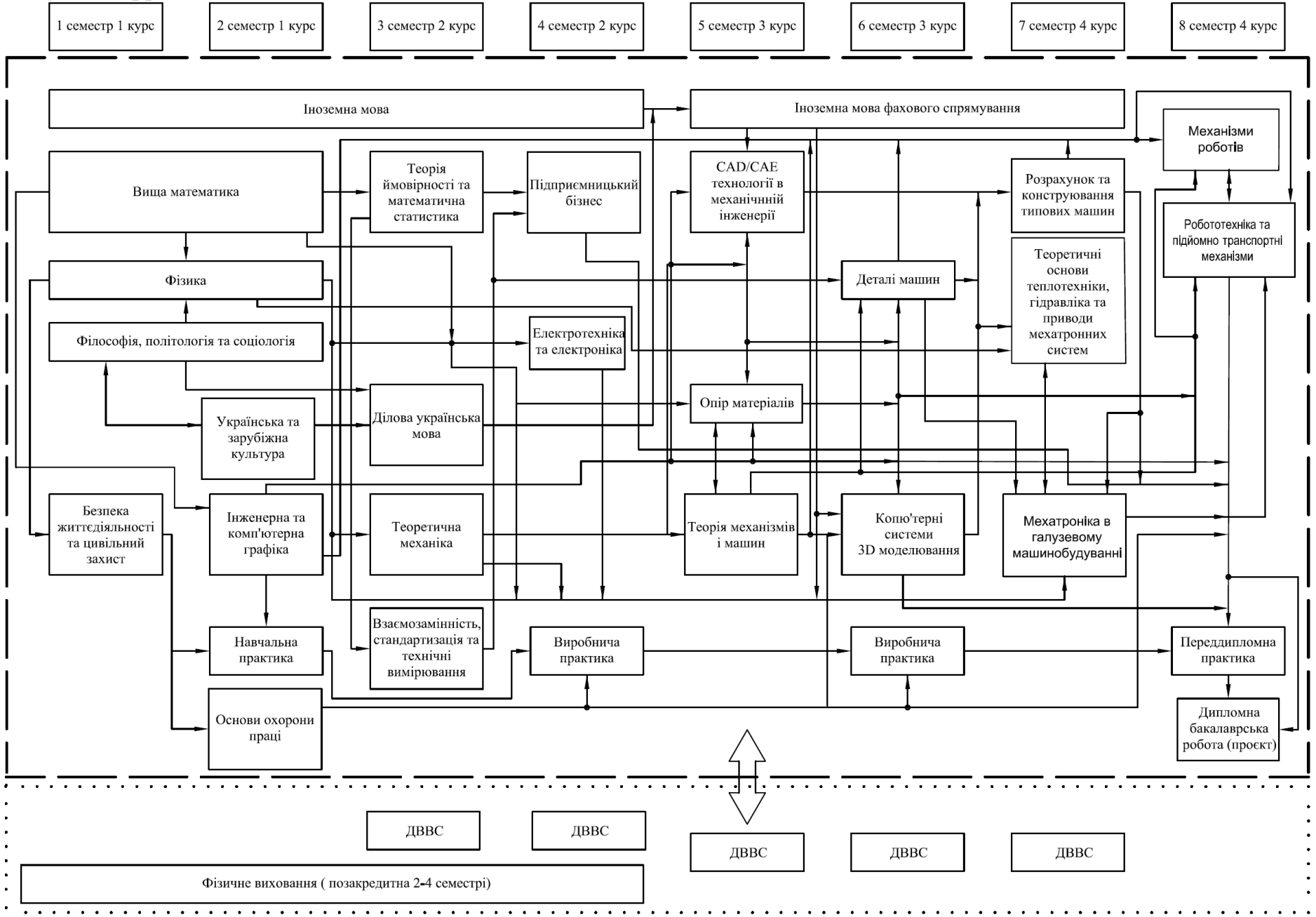
2. The list of components of the educational-professional program and their logical sequence

2.1 List of components of the educational-professional program of the first (bachelor's) level of higher education

Code	Components of the educational program (academic disciplines, term papers (projects), practices, qualification work)	Number of loans	Form of final control
1	2	3	4
Mandatory components of the educational program			
General training cycle			
OK 1	Business Ukrainian	3	test
OK 2	Foreign Language (English,German,French)	12	credit / exam
OK 3	Ukrainian and foreign culture	3	test
OK 4	Philosophy, political science and sociology	6	exam
OK 5	Physical education1	3/9	test
OK 6	Higher mathematics	12	credit / exam
OK 7	Probability theory and mathematical statistics	3	exam
OK 8	Physics	12	credit / exam
OK 9	Engineering and computer graphics	6	exam
OK 10	Electrical engineering and electronics	6	exam
OK 11	Entrepreneurial business	3	test
OK 12	Life safety and civil protection	3	exam
OK 13	Basics of labor protection	3	exam
Total from the cycle		**75**	
Cycle of professional training			
OK 14	Theoretical mechanics	6	exam
OK 15	Theory of mechanisms and machines	6	exam
OK 16	Strength of Materials	6	exam
OK 17	Details of machines	6	exam
OK 18	Foreign language of professional orientation (English,German)	12	credit / exam
OK 19	Interchangeability, standardization and technical measurement	3	exam
OK 20	Theoretical foundations of heat engineering, hydraulics and drives of mechatronic systems	6	exam
OK 21	Robotics and hoisting and transport mechanisms	6	exam
OK 22	Calculation and design of typical machines	3	exam
OK 23	Computer systems 3D modeling	3	exam
OK 24	Mechatronics in the field of mechanical engineering	6	exam
OK 25	CAD / CAE technology in mechanical engineering	3	exam
OK 26	Mechanisms of robots	3	exam
OK 27	Educational practice	6	test
OK 28	Internship	12	test
OK 29	Pre-diploma practice	6	test
OK 30	Bachelor's thesis (project)	12	certification
Total from the cycle		105	
The total amount of required components		**180**	
Selective components of the educational program			
DFCS	Disciplines of free choice of the student	60	test
The total amount of sample components		**60**	
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		**240**	

[1]- non-credit disciplinein 2,3,4 semesters.

2.2 Structural and logical scheme of bachelor's degreeeducational and professional program Applied Mechanicsin the specialty 131 Applied Mechanics



3. Form of certification of applicants for higher education

Forms of certification of applicants for higher education	Certification of a graduate of an educational program is carried out in the form of public defense of a bachelor's thesis (project).
Document of higher education	Bachelor's degree with educational qualification: Bachelor of Applied Mechanics.

4. Matrix of correspondence of program competencies to the components of the educational-professional program

	LC 1	LC 2	LC 3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	GC12	GC13	GC14	GC15	PC 1	PC 2	PC 3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12
OK1					+	+	+		+		+																
OK2				+			+	+	+																		
OK3							+							+	+												
OK4	+					+					+			+	+												
OK5					+										+												
OK6	+		+	+			+													+							
OK7	+			+								+				+				+				+			
OK8		+		+												+				+				+	+		
OK9	+			+																	+	+	+				
OK10		+		+			+														+						
OK11		+			+				+				+					+									
OK12		+	+							+	+			+										+			
OK13		+	+							+	+			+										+	+		
OK14				+												+				+					+		
OK15				+												+	+			+					+		
OK16				+												+	+			+							
OK17				+												+	+			+							
OK18				+		+		+	+					+													
OK19				+								+	+								+			+			
OK20				+												+									+	+	
OK21				+													+		+					+			
OK22				+												+	+			+						+	
OK23	+								+													+	+	+			+

	LC 1	LC 2	LC 3	GC4	GC5	GC6	GC7	GC8	GC9	GC10	GC11	GC12	GC13	GC14	GC15	PC 1	PC 2	PC 3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11	PC12
OK24			+	+					+										+			+				+	
OK25				+																+		+					
OK26																	+			+					+	+	
OK27		+					+															+	+	+			
OK28		+		+		+				+								+	+						+		
OK29		+	+									+					+	+	+		+	+			+		
OK30	+								+			+	+		+	+	+	+	+	+	+	+	+	+	+	+	+

5. Matrix for providing program learning outcomes with relevant components of the educational-professional program

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PLO 13	PLO 14	PLO 15	PLO 16	PLO 17	PLO 18	PLO 19	PLO 20	PLO 21
OK1																				+	
OK2																				+	
OK3							+														
OK4							+														
OK5																					+
OK6	+								+												
OK7	+								+												
OK8	+	+	+						+	+											
OK9													+		+	+					
OK10			+	+	+					+											
OK11																	+	+			
OK12															+				+		
OK13															+				+		+
OK14		+							+					+							
OK15		+							+		+	+		+							
OK16		+							+		+	+		+							
OK17		+		+					+				+					+			
OK18																				+	
OK19	+													+	+						
OK20			+			+				+											
OK21		+		+						+				+				+			
OK22					+	+			+				+								
OK23			+					+		+	+	+	+			+					
OK24			+	+	+					+								+			
OK25									+							+					
OK26		+							+			+		+							
OK27			+											+		+					
OK28				+	+													+	+	+	
OK29				+	+				+				+	+		+					
OK30	+				+	+		+	+	+	+	+	+	+	+	+	+	+	+	+	