LIST OF NATIONAL EDUCATION CODE (NEC), FIELD OF RESEARCH (F.O.R)
& SUB-SPECIALIZATION 2023

NEC	FACULTY	F.O.R	SUB-SPECIALIZATION
NEC 0220 (Humanities (except languages not further defined)	Centre for Human Sciences	Humanities	• **Islamic Studies** Islamic studies deals with Islam as a religion and civilization from an Islamic perspective. It includes all the traditional forms of religious thought such as Tafsir (Quranic exegesis), Hadith (Traditions of the Prophet), Kalaam (Islamic philosophy), Fiqh (Islamic jurisprudence), Tasawwuf (Sufism) Muslim philosophy, history of Islam and Muslims. • **Historical Studies and Civilisation Studies** The historical and civilization studies deal with world history from the time of its earliest appearance until the pre-modern period, and from its Western and Eastern frontiers with special reference to Islamic Civilisation.
NEC 0230 (Languages not further defined)	Centre for Modern Languages	Languges	• **Linguistics** The scientific study of the nature and structure of human language includes studying the patterns in language and its formal structures. • **Applied Linguistics** The scientific study which concerned with the relation of knowledge about language to decision making in the real world" (Cook, 2003; 5). A scientific study that provides the theoretical foundations for the investigation and solutions of language-related problems (practical applications) (Hudson, R.)
			• **Language Studies** The scientific study of one or more languages and awareness of cultures and understanding of the structure and use of human language. The study considers the history and present status of the language.
NEC 0310 (Social and behavioral sciences not further defined)	Centre for Human Sciences	Social Sciences	• **Psychological Studies** Philosophy studies is the systematic study of ideas and issues, a reasoned pursuit of fundamental truths, a quest for a comprehensive understanding of the world, a study of principles of conduct, and much more.

			• **Culture and Heritage Studies** The studies focus on developing aptitudes for the critical assessment of tangible structures and objects such as monuments and works of art; And on intangible heritage like traditions, languages, and knowledge; and on environmental heritage connected to human-nature interactions. • **Special Training and Education** Special Training and Education will cover research in education and training such as Technical and Vocational Education and Training (TVET), Teacher Training and Education, Continuous Professional Development Education, Adult and Life-Long Education, Community Education, and Tertiary Education. • **Political Sciences** Political science is the scientific study of politics at local, national, and international levels. The research will examine systems of governance and power through the analysis of political activities, political thought, political behaviour, international relations, and political theory. • **Developmental Studies** Development Studies is a multi- and inter-disciplinary topic of study that can be broadly categorised into two subfields: community development and fundamental development. The researcher aims to comprehend how societal development at the local, national, regional, and international levels is influenced by social, economic, political, technological, cultural, and gendered factors. The study will look into community leadership, social development, sustainable development, human development, education and development, and development theory in depth.
NEC 0410 (Business and administration not further defined)	Faculty of Industrial Management	Business and Management	• **Finance, Accounting and Economics** Researchers will be dealing with different topics that are related to the issues of financial, accounting and economics. From accounting perspective, the research areas may cover financial accounting, managerial accounting, taxation and auditing, social and environmental accounting, public sector accounting, accounting information system, financial reporting, and any other accounting related issues. From finance perspective, researchers may look into the issues which include behavioral finance, corporate Finance, international finance, banking,

			financial intermediation and markets, behavioral finance, Investment and portfolio management, theoretical asset pricing, performance measurement and any other financial related issues. From economics perspective, researchers may focus on the areas which include econometrics and empirical economics, theoretical and applied statistics and demography, microeconomics, macroeconomics, monetary theory and international economics, public economics and regulation, business economics and industrial organization, economics history and economics theory, and any other economics related issues. • **Project Management** It considers wide range of industrial niche and aims to contribute research novelty in the domain of Project Life Cycle, Integration, Scope, Time, Cost, Quality, Human Resource, Communications, Risk, Procurement, Stakeholder, Professional and Social Responsibility. • **Environmental, Social and Governance** Researchers will be dealing with different topics that are related to the issues of organizations dealing with environmental, social and governance. Topics focuses on organizations are; leadership, strategic planning, strategy execution/measurement, resource management dan development, organizational culture and behaviour, negotiation strategy, change management, human resource development and management. Topics on issues in governance and ethics on organizations which may include; corporate governance, social and governance accounting, Islamic corporate governance, governance of public sector organizations and ethics. • **Marketing & Entrepreneurship** This field of research covers the two segments; marketing and entrepreneurship. Marketing is the traditional approach which includes targeting and segmentation. The entrepreneurial way starts with a creative idea and then trying to find a market for it. The diverse field of marketing including advertising, the generic scope of marketing, special topics in advertising and marketing. While the entrepreneurship segment covers the entrepreneurial development, entrepreneurial studies, micro, small and medium enterprises, social entrepreneurship and special topics in entrepreneurship.

			• **Operations and Supply Chain Management** Includes a broad area in both manufacturing and service industries, involving all functions along the entire supply chain networks from upstream to downstream operations. It covers diverse business functions such as sourcing, materials management, production management, distribution, logistics, transportation, retail, demand forecasting, order fulfillment, business process re-engineering, operations sustainability, and more. Professionals in these fields work with such functions while enhancing organizational performance to ultimately achieve business excellence and sustainability. • **Science, Technology & Innovation (STI) Management** Topics on STI management will cover on emerging technology management, green technology and low carbon technology, new product and service management, quality performance and reliability, research and development management, and strategic management of technology. • **Business Analytics** Business analytics is an interdisciplinary area involving applying quantitative and behavioral methods aided by technology to analyze and address the complex problems of an organization. The recent advances in big data resulted in data explosion, making way for the much-needed analytical approaches to facilitate decision-making process.
NEC 0510 (Biological and related sciences not further defined)	Faculty of Industrial Sciences and Technology	Biotechnology	• **Biotechnology** Biotechnology is a technology that utilises biological systems, living organisms or parts of this to develop or create new products, methods and organisms intended to improve human health and society. Biotechnology covers various disciplines of science and technology, including molecular biology, biochemistry, genetic engineering, genomics, nanotechnology, and bioinformatics. This approach has resulted in innovations and breakthroughs in the area of medicines and therapeutics, medical diagnostics, biofuels, genetically modified organisms (GMO), agriculture, industrial biotechnology including useful food products, etc.
NEC 0530 (Physical sciences not further defined)		Physical Sciences	• **Advanced Materials** The advanced materials strive to excel in the area of innovative multifunctional and hybrid materials for a range of applications from renewable energy devices to cost effective household furniture's. Aim to attract capital investments in the areas of metals, metal oxides,

	Faculty of Industrial Sciences and Technology		polymers, and polymer – nanocomposites, carbon nanotubes, graphene, liquid crystals, advanced catalysts, and various multifunctional organic materials. The cluster undertakes cutting edge research on a range of functionalities such as conducting, semiconducting, dielectric, superconducting, photonic properties of the materials for technological advancements. • **Physics** The study which deals with the structure of matter and how the fundamental constituents of the universe interact. • **Chemistry** The study of matter and its change can be broadly divided into a multitude branches including industrial applications, particularly in the processes and arts of chemical manufacturing and commercial production.
NEC 1022 (Occupational health and safety)		Occupational Health and Safety	• **Occupational Health and Safety** Occupational health and safety (OHS) is commonly referred to as occupational health or occupational safety and it is a multidisciplinary field concerned with people's health, safety, and welfare across all occupations. OHS addresses various workplace hazards, including chemical, physical, biological, psychosocial, ergonomic and workplace accidents. This field encourages a researcher to apply scientific investigations to study how the research output can be effectively translated into a real practice and have an impact. It includes the study of how OHS knowledge and interventions are disseminated, adopted, implemented, and institutionalized.

NEC 0540 (Mathematics and statistics not further defined)	Centre for Mathematical Sciences	Mathematics and Statistics	• **Statistics** Statistics deal with every aspect of the data. It is a study of the scientific process of collecting, organizing, summarizing, analyzing, presenting, interpreting, and drawing conclusions from data. Statistical knowledge helps to choose the proper method of collecting the data and employ those samples in the correct analysis process in order to effectively produce the results. In short, statistics is a crucial process that helps to make decisions based on the data. It can also be used for making predictions about future events and behaviors. Statistics also help us understand how things are changing over time. Statistics is a foundation upon which data science has been built. Through statistical methods, analysis, and an emphasis on real-world data, applied statisticians seek concrete solutions to tangible problems. • **Mathematics** Mathematics is the study of abstract deductive systems. It includes the topics of numbers, formulas and related structures, shapes and spaces, and quantities and their changes. It involves the study of mathematical concepts, the application of mathematical knowledge to other fields, and computational mathematics which is an area of mathematics devoted to the interaction between mathematics and computer computation. • **Data Analytics** Data analytics is an interdisciplinary field that uses mathematics and statistics, specialized programming, advanced analytics, artificial intelligence (AI), and machine learning (the science of teaching computers to analyze data as humans do) in conjunction with in-depth knowledge of a particular subject area to mine an organization's big data for insights that can be put into action. It is the field of study that combines domain expertise, programming skills, and knowledge of mathematics and statistics to extract insightful information from big data. These realizations can serve as a basis for decision-making and can be incorporated into strategic planning. The data analytics lifecycle includes a variety of roles, tools, techniques, and processes that allow analysts to derive actionable insights from the data gathered.
NEC 0610 (Information and communication	Faculty of Computing	Computing	• **Information Systems** The research field focus on Information system and database technology. Example includes, but not limited to, business intelligence, data analytic, information and knowledge management, green IT/IS and Sustainability, social media and business/Society Impact.

technologies (ICTs) not further defined)			• **Software Engineering** The research mainly focuses on proposing a novelty in the various fields of software engineering. Example of fields but not limited to are Software Process Models, Software Management, Requirements Engineering, Software Design, Software Metrics, Software Quality, Software Reliability, Software Usability, Software Maintenance, Software Testing, Search-Based- Software Engineering. • **Multimedia Computing And Computer Vision** The research mainly focus on multimedia and image processing. Example includes, but not limited to, computer graphics and animations, edutainment, interface design, data hiding and steganography, detection and estimation, pattern recognition and image recognition, speech recognition, watermarking techniques. • **Artificial Intelligence and Machine Learning** The research field mainly focuses on the development and applications of Artificial Intelligence and Machine Learning that cover the key areas such as the applications of AI and machine learning across other disciplines, such as physics, chemistry, healthcare, engineering, and social science. It also covers the fundamental developments in artificial intelligence and machine learning, such as AI development, machine learning models and intelligent machines. • **Computer Systems and Networks** The research field involves area in networking, communication and distributed computing. The example includes, but not limited to, high performance computing, mobile computing WSN, and cloud computing. • **Digital and Cyber Security** The research is mainly focus on the application of technologies, processes, and controls to protect systems, networks, programs, devices and data from cyber attacks. It also focus to reduce the risk of cyber attacks and protect against the unauthorised exploitation of systems, networks, and technologies.

			• **Software Technology** The research is mainly focus on the techniques, methods, and tools used in the development, maintenance, and management of software systems. It encompasses a wide range of disciplines and encompasses the entire software development life cycle, from the initial requirements gathering and design, to the implementation and testing, to the deployment and maintenance of software systems. It also includes the development of new software development methodologies, programming languages, and tools to improve the efficiency, effectiveness, and quality of software systems. Software technology research aims to create new and better ways of developing software systems, making them more reliable, scalable, secure, and user-friendly.
NEC 0710 (Engineering and engineering trades not further defined)	Faculty of Chemical and Process Engineering Technology	Chemical Engineering	• **Chemical Engineering** Chemical engineering fundamental and applied research for enhancing processes to turn raw materials into usable products. • **Bioprocess Engineering** Designing, developing, and evaluating processes that use biological resources, such as animals, plants, and microbes, to create/manufacture products. • **Mining and Mineral Processing Engineering** Focused on the advancement of upstream, midstream & downstream mining and mineral processing. • **Environmental Process Engineering** Environmental process engineering is the application of scientific and engineering principles to improve and maintain the environment to protect human health, protect nature's beneficial ecosystems, and improve environmental-related enhancement of the quality of human life. Research works to address environmental issues encompass environmental technology, green technology, and clean technology using chemical engineering solutions or principles. • **Renewable Energy and Energy Security** Renewable energy and energy security, referred to clean energy, derive from natural sources or processes that are naturally replenished and do not run out. Technologies promoting

NEC 0710 (Engineering and engineering trades not further defined)			renewable energy include technologies developed to generate renewable energy sources and technologies designed to improve energy efficiency. • **Gas and Petroleum Engineering** Gas engineering refers to the design, implementation and operation of technical processes focusing on the technical and processing of gas and natural gas liquids. Petroleum engineering and technology covers activities associated with exploring, producing and processing hydrocarbons and chemical substances, including crude oil or natural gas. • **Pharmaceutical Technology** Pharmaceutical Technology is an application of technologies used for the development, formulation, and evaluation of pharmaceutical and other related products such as herbal, cosmetics and functional food preparations.
	Faculty of Mechanical and Automotive Engineering Technology	Mechanical Engineering	• **Automotive Engineering** Automotive Research focuses on key trends of cutting-edge technology in automotive technology including intelligent transportation; mobility; combustion; cooling and tribology; fuels, fluids and thermal systems; battery and brake; energy infrastructure; vehicle dynamics; optimization and control; modelling and analysis; nanotechnology; advanced material for automotive; fracture and fatigue; electric and hybrid vehicles; additive manufacturing for automotive; technology forecasting. • **Biomedical Engineering** The research focus on innovations and design technological solutions for the medical industry. Examples includes, but not limited to artificial internal organs and body parts, biomedical machines, equipment, software, healthcare monitoring system, medical devices , virtual trials and surgical simulation. • **Human Technology** The research focus on innovations and design technological solutions for human-centered interests. Examples includes, but not limited to biomechanics, biomedicals, rehabilitation, serious game for health and gamification, preventive healthcare, ergonomics, sports, virtual reality, simulation, and safety.

NEC 0710 (Engineering and engineering trades not further defined)			• **Structural Materials and Degradation** The research focuses on structural material performance under various mechanical loadings, its mechanics and degradations. The example includes, but is not limited to, fracture and damage mechanics, creep, fatigue, high energy loads on metallic alloys, composites, and polymers, as well as corrosions, coatings and protections. • **Energy Engineering and Green Technology** The research concentrates on diverse research theme around sustainable energy, and green technology including energy conversion and efficiency, energy auditing, modelling and policy, environmental management, wind tunnel studies, wind turbine, solar energy, thermal comfort, air quality, refrigeration and air conditioning system, as well as energy modelling. • **Structural Integrity and Vibration** Focuses on the applied research related to the prognosis, predictive, and condition monitoring of the various engineering structures, systems, or manufacturing processes based on the fundamental of dynamic, vibration, acoustic, optic, sensors, signal processing & machine learning. • **Thermo Fluids** Thermo-Fluid incorporate thermal and fluid engineering. Thermal engineering focuses on the R&D of heat and mass transfer, thermophysical properties of substances, and the designs and performance of various heat systems. Fluid engineering focuses on the R&D of high-tech liquids and gases for coolants, lubricants, refrigerants, nano-materials, and so on. • **Mechanical Design and Material Processing** This field of research focus on designing of mechanical system and processing of material development, alloys and method, particularly on non-ferrous and ferrous material, and alloy composition.

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NEC 0710 (Engineering and engineering trades not further defined)	Faculty of Electrical and Electronics Engineering Technology	Electrical and Electronic Engineering	• **Instrumentation and Control Engineering** The instrumentation and control engineering field of research focuses on the development, implementation, design, measurement, algorithm analysis, and application the state-of-the-art technologies of control knowledge and instrumentation that are related to applied electrical and electronics areas. • **Applied Electronics and Communication Engineering** The applied electronics and communication engineering field of research has a wide range of research in applied electronics, signal, and communication engineering areas. The implementation, algorithm analysis, innovation, and application the state-of-the-art technologies and methods are anchored in this research field for technological and scientific development. • **Energy and Electrical Power Engineering** The Energy and Electrical Power Engineering field of research focuses on the development, implementation, design, and application the state-of-the-art technologies and methods in electrical power engineering areas and problems. It consists of the range from the electrical supply and energy to end users of electricity supply.
	Faculty of Civil Engineering Technology	Civil Engineering	• **Geotechnical and Infrastructures** The Geotechnical and Infrastructures field of research involve the application of the sciences of soil mechanics and rock mechanics, engineering geology and other related disciplines to civil engineering construction, the preservation and enhancement of the environment. Geotechnical engineering activities are a part of a team effort involving other disciplines including geology, structural engineering, construction management, hydraulics, earthquake and transportation engineers, and other pertinent branches like infrastructure field that related and not limited to highway and traffic engineering. • **Sustainable Infrastructure and Construction** The Sustainable Infrastructure and Construction field of research examines equipment and systems that are planned, designed, constructed, operated and decommissioned in a manner that ensures economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire infrastructure life cycle.

NEC 0710 (Engineering and engineering trades not further defined)			• **Structures and Materials** The Structures and Materials field of research focuses on improving the strength, toughness, and durability of materials used in the construction of buildings, bridges, and other infrastructure. Among the exciting area in structural study are structural dynamics & reliability, bridge engineering, earthquake engineering, and others. The properties of sustainable construction materials upon integrating diverse types of waste as mixing ingredients are also an interesting area of research. • **Construction Management** The Construction Management field of research can be divided into three main phases which are before, during (construction management) and after the construction. Before construction the FOR involve are feasibility study, design development, documentation & tendering. While during the construction phase, procurement systems, supply chain management, industrial development, method or technique of implementation, productivity analysis, risk management during the construction phase, and sustainability involve. While, after the construction FOR are facilities management, maintenance and operation management. • **Water Resources and Hydraulic Engineering** The Hydrology and Hydraulic Engineering field of research focuses on all inter-disciplinary water-related problems, including environmental water management, water resources assessment and management, hydraulics and hydrology, water availability assessment, flood forecasting, flood risk and mitigation plans that provide understanding and solutions to the water problem. It is also addressing the impact of the climate changes on the sustainable future water planning. • **Sustainable Environmental Engineering** The Sustainable Environmental Engineering field of research relates to protecting and preserving the environment and the consumption of resources. The scope includes issues of environmental engineering, technologies, management and related fields, especially in response to sustainable water, energy and other natural resources.

NEC 0720 (Manufacturing and processing not further defined)	Faculty of Manufacturing and Mechatronic Engineering Technology	Manufacturing and Mechatronic engineering	• **Engineering Materials** The engineering materials focuses on the material performance for a range of applications in the manufacturing area. The cluster undertakes cutting edge research on a range of areas such as surface tribology, lubrication performance for machining, as well as material processing • **Mechatronics and Robotics** Mechatronics and robotics is a multidisciplinary field that refers to several skills set in mechanical, electrical, electronics, computer science, control system, optimization and machine learning. This field is a state of art area which encourages a researcher to apply scientific investigations in developing a robotics and mechatronics devices by combining the elements of mechanical and electronic technologies. • **Technology for Manufacturing and Industry** Technology for Manufacturing and Industry field of research focuses on key trends of manufacturing and industrial technology. It offers diversity of research and solutions, starting from design, analysis and simulation, as well as real manufacturing environment. The research covers the application tool and process which developed through scientific, industrial and engineering advances which aims to improve the efficiency, quality and productivity of manufacturing and industrial operations.