This multidisciplinary program establishes the theoretical and practical foundations necessary to be at the forefront of progress in the next technological revolution. Advancements made in artificial intelligence and related disciplines will soon touch every piece of technology and aspect of life, making an advanced degree in this field an essential asset for a successful career in a wide range of business and industrial sectors.

In this program, students are exposed to topics such as machine learning, deep learning, computer vision, and natural language processing. Furthermore, it also covers classification, regression, clustering, dimensionality reduction, perception, motion and manipulation, reinforcement learning, and various types of neural networks. It promotes interdisciplinary education where computer science intersects with mathematics and engineering. The applications of this program are wide-ranging and include automatic image and video processing, healthcare, financial data and trading, speech recognition, facial identification, and seismic survey processing.
This multidisciplinary program is designed to prepare students to enter the field of cybersecurity and blockchains. Both fields share a common foundation and are interlinked, and both are substantially demanded by the job market, especially given the rapid increase in computerization, virtual communication, online transactions, and money transfers.

This program covers topics in secure and trusted computing, including data and information assurance, identification of cyber assets and related security risks and threats, measurement of system resilience against cyber-attacks, and security policy compliance and governance. Students learn the pillars of computer security and data privacy and how they affect complex systems (e.g. manufacturing plants). Topics include cryptology, access control models, intrusion detection systems, and integrity verification mechanisms. Students also learn the fundamentals of Blockchain technology, including record and hash replication, and types of blockchains (public, private, and hybrid), as well the applications in cryptocurrency and various other scientific, engineering, and business cases.
Master of Robotics and Autonomous Systems

This multidisciplinary program brings together students from various engineering backgrounds and equips them with the necessary education to lead a successful career in this quickly rising discipline. Robots are becoming ubiquitous, from medical robotic surgeries all the way to warehouse management and package delivery, as well as the maintenance and operations of manufacturing plants. They touch all aspects of our lives.

The program covers subjects related to mechatronics, robotics, and UAVs (drones). Students develop the skills required to understand, design, and implement smart systems and robots to solve engineering problems. Topics include artificial intelligence, machine learning, the fundamentals of autonomous system (including sensing, reasoning, and acting). Also, it covers robotics-specific topics such as power sources, machine vision, actuation (e.g. linear actuators and electric motors), manipulation, locomotion (walking, rolling, climbing, etc.), environmental navigation, and human-robot interaction (including speech recognition and gestures). Applications are wide-ranging, and include industrial robots, as well as those used in the military, construction, agriculture, and in medical fields.

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This multidisciplinary program delves into the next generation of computing, which will take compute power and the ability to solve extremely complex problems, whether in medicine, modeling, or telecommunication to the next level, and is therefore demanded by many employers in these and other sectors.

The program covers quantum theory and how it is applied in the fields of computing and communication. It covers the concepts of qubits, superposition, entanglement, quantum gates, and quantum algorithms in order to understand the difference between classical and quantum computing. Other topics include quantum electrodynamics, including cavity and circuit qubits, quantum superconductivity, non-linear harmonic oscillators, etc. Students are introduced to quantum computing concepts such as quantum hardware, processors, circuits, instruction sets, quantum programming languages, quantum error correction, algorithms, and quantum cryptography. Students learn how to design, simulate, and test the core parts of a superconducting Qubit.
This multidisciplinary program prepares professionals for a career in turning data into useful information, a discipline substantially demanded in the job market, as data is generated by the quintillion of bytes every day and is becoming a precious resource for nations’ advancement.

Organizations increasingly heavily depend on sophisticated analytical tools to draw meaningful insights from data in order for their businesses to thrive.

This program focuses on the analysis and handling of data from multiple sources and for various applications in order to draw inferences from it. Topics include probability theory, inference, least-square and maximum likelihood estimation, forecasting, finding local and global optimal solutions (gradient descent, genetic algorithms, etc.), and generalized additive models. It also covers machine deep learning topics such as classification, conditional probability estimation, clustering, dimensionality reduction, and decision support systems. The program also covers big data analysis, including big data collection, preparation, preprocessing, warehousing, interactive visualization, analysis, scrubbing, mining, management, modeling, and tools such as Hadoop, Map-Reduce, Apache Spark, etc.
This is an interdisciplinary program designed to provide knowledge and essential skills to solving real-world problems using computational tools, including modeling systems and phenomena and simulating them in order to fully optimize them. Graduates of this discipline are highly demanded in both business and industry, as these sectors seek to become more effective and successful in their operations.

This program focuses on developing models to understand the inherent structure of the data. Topics include probability theory, inference, least-square estimation, interpolations, adaptive approximations, numerical differentiation and integration, quadrature, multistep methods, finite difference, and applications to steady-state and time-dependent problems involving initial-value and boundary-value problems. The program also covers simulation, in terms of queuing systems, stochastic processes, random number generation, numerical methods, and software techniques for building simulators. The inverse problem is also covered, whose methods describe identifying the parameters and structures of models that give rise to the recorded observation, an essential tool to understanding physical phenomena.
This multidisciplinary program prepares professionals to fully understand the science of materials and how this science can be used to engineer these materials. This is key to driving product innovation in all industries from aviation, medical equipment, and gadgets, all the way to environmentally friendly and biodegradable products.

This program focuses on the desire to increase in the mechanical and environmental longevity of components in manufacturing, with wide applicability to materials processing, oil and gas, and manufacturing industries. Topics include the structures and mechanical, electrical, and thermal properties of non-metallics, and the processing of ceramics, polymers, and composites. Students learn materials selection and design, mechanical design process, product shape, multiple constraints, conflicting objectives, hybrid materials, the impact of materials selection on the environment, composite materials and their application, fibers, matrices, etc. Topics also cover polymers (homogeneous and heterogeneous polymerization processes, engineering properties of polymers, etc.), and the failure of materials.
The world is increasingly moving to using conventional energy sources as feedstock to petrochemical materials, rather than just burning them as fuels. This multidisciplinary program prepares professionals for this highly demanded sector, especially with the rapid growth of petrochemical industries in the region.

This is a specialized program that provides a thorough understanding of the direct and indirect routes for converting oils to chemicals, macular theories of adsorption and catalysis, type of polymerization reaction, and the principle of material processing with focus on polymers. The program also covers industrial fluidized bed reactors coupled with risk assessment methods, performance assessment, human reliability modeling, and SHARP method with quantitative models. Crude oil characterization and PVT analysis, asphaltene instability, and hydrate formation are discussed as well. Other topics include key concepts on sequential modular and equation-oriented simulators, construction and convergence of petrochemical processes, tearing and convergence algorithms.
This multidisciplinary program is at the heart of the petrochemical industry and advanced manufacturing. Understanding this topic is key to becoming a successful professional who understands how to effectively develop the right tools to maximize value in petrochemical, manufacturing, or synthesis plants and satisfy the current and future needs of the industry’s processes.

The program covers catalysis and its application in petrochemical industry. It provides the students with the knowledge to identify and apply various catalysts in the petrochemical industry. Topics include chemical kinetics and reaction mechanisms including methodology of mechanistic organic/inorganic chemistry, reactive intermediates, kinetics of homogeneous and heterogeneous catalysis. Furthermore, it also covers industrial catalysis with focus on the role of transition metals in catalytic processes, embracing the fundamentals of heterogeneous catalysis, including catalyst production and applications, shape selective catalysts, and the role of environmental catalysis in green chemistry. The program promotes interdisciplinary education where chemistry intersects with chemical engineering.
This multidisciplinary program provides students with modern knowledge and practical experience in polymer chemistry and engineering, a profession prized in the job market as the world is shifting from using hydrocarbons not only as fuels, but also into using them in the petrochemical industry and non-metallics, as well as from commodity to specialty chemicals.

This program includes the synthesis, characterization, and applications of various polymeric materials. Topics include polymerization reactions, polymerization techniques (step-growth, radical, ionic, ring-opening, transition metal catalysts), complex coordination polymerization, copolymerization, and addition polymerization using anionic, cationic, and radical processes. Other topics include polymer kinetics, stereochemistry, structure, and structure-property relationships, as well as polymer characterization, processing, rheology, homogeneous and heterogeneous polymerization processes, specialty polymers, industrial reactions of polymers, as well as the applications of polymeric materials in the oil and gas industry. In addition, the sustainability and degradation of polymers are also discussed.

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This multidisciplinary program focuses on a field that is rapidly evolving and strongly demanded, since understanding the properties of materials is key for manufacturing usable, robust, and economically viable products. Students are educated to be able to model, simulate, and design materials of desirable properties.

The program studies the interrelation between the structure and properties of materials, which is at the heart of understanding material behavior at a range of different length and time scales. Topics include Monte Carlo simulation, Markov chains, random walks, stochastic systems (e.g. Brownian dynamics), and continuous phase transitions in lattices. The program also covers atomistic simulations, including molecular dynamics simulations and density functional theory, as well as applications in catalysis, nanomaterials, alloy design, corrosion inhibitors, and 3D printing. Other topics include material informatics, e.g. machine learning (regression, classification, unsupervised learning, etc.) and its application in materials selection for engineering design and multi-scale modeling.
This multidisciplinary program prepares professionals for the exciting and rapidly expanding industry of wireless communications. The world is increasingly abandoning the wire, so future careers in communication will invariably depend on professionals who fully understand wireless protocols and devices at multiple scales.

This program focuses on contemporary and novel topics in wireless communications, including network layering, digital communication, wireless protocols (from 2G to 5G, leading to 6G), spectrum regulation, management, and security. Topics include space representation of signals, detection of signals in noise, band-pass modulation techniques, cellular systems, propagation modeling, digital transmission techniques, diversity, and multiple access techniques. Other topics include optical fibers, waveguides, light sources, IoT principles and application requirements, network management standards, models, and protocols, frequency planning, spectrum management authorities, global interoperability, standardization bodies, testing and certifications, and wireless communications development.
This multidisciplinary program equips professionals with the knowledge required to address the challenges of transforming the energy sector into a highly efficient and reliable one, focusing on two complimentary sectors that are highly prized in the job market, which are the sustainable use of conventional energy and the rapid rise of renewables.

This program covers various renewable energy technologies, including solar (photovoltaic and concentrated solar power), wind, hydrogen, geothermal, and waste-to-energy systems, as well as energy storage options such as electrical (e.g. batteries and super capacitors), fuel cells, and thermal storage. Students understand the components of renewable energy systems at and their performance and study the integration of renewable systems with storage and conventional systems. The program also covers sustainable energy systems (including energy outlook and the environment, global warming, and techno-economic analysis). The program also includes renewable energy project management, grid integration, smart grids, net-zero buildings, and touches on renewable energy policy and environmental law.
This program prepares students to become experts in the rapidly growing field of bioengineering, which focuses on the application of engineering tools to the principles of biology in order to create usable, robust products. Such professionals are highly demanded in numerous sectors such as reaction plants, environmental processes, and medical therapeutic medication industry.

This program focuses on cell and molecular biology, animal developmental biology (including discussion on homeostasis, organs regulations, body systems and their functions, biomaterial science (in support of medical applications), biotechnology techniques and how they are applied to solve environmental problems, and bioreaction rates (including bioreactor design, immobilization and immobilized bioreactors, fermentation, etc.). The program also provides knowledge in mathematical and engineering modelling tools describing biological systems behaviors. The applications of this program includes vary widely from genetics and molecular biology to the developments of biotechnological products in medicine, environment, agriculture, and industrial manufacturing.

KFUPM is now offering One-Year Master’s Degrees designed to enhance careers.
This interdisciplinary program provides students with the skills and competence necessary for managing global supply chains, and paves the way for further professional certification in this field. It is one of the most sought after career advancement tracks, as supply chain management has become an essential component of the success of many businesses, not just globally, but also locally.

This program covers the systematic and strategic coordination management for supplying goods and services required by the end customer. Topics include supply chain strategies, drivers, transportation, sourcing, distribution networks, global networks, sustainability, and procurement (supplier management purchasing, policies, procedures, global sourcing, cost management, negotiation, etc.). Other topics cover logistics, including lean systems, market distribution, manufacturing, production forecasting, inventory control, optimization, warehouse management, deterministic and stochastic inventory systems, capacity planning, and material requirement planning. Students are equipped with the skills to manage and run effective and efficient supply chain businesses.