DEPARTMENT OF MATHEMATICS & COMPUTER SCIENCE

Sr.No	Course Code	Student Id	Name of the Student	Title of the Project	Abstract
1	CPT 383	20199931 20202070 20202149	Maram Mahmood Al Farsi Rawnaq Salim Al Aufi Raiyan Ahmed Al Wahaibi	Biometric Authentication System for Smart Appliance using IoT	This concept merges biometric authentication technology with internet-of-things (IoT) enabled smart appliances to enhance security and user convenience. This system offers robust security by providing unique user identifiers, eliminating the need for passwords, and supporting multi-factor authentication. This project introduces a biometric authentication system for smart appliances using fingerprint recognition, integrated with Internet of Things (IoT) technologies, to enhance security, usability, and monitoring capabilities. The system leverages fingerprint authentication to grant users secure and personalized access to smart devices, replacing traditional methods such as passwords. Advanced features include automatic screen recording, utilizing Bandi Cam, initiated upon successful fingerprint login to capture user interactions during the session. This

					ensures robust activity monitoring and traceability. Additionally, the system generates detailed Excel reports that log user login and logout activities, including timestamps, user identities, and authentication statuses. These reports enhance accountability and provide a comprehensive audit trail for system access. Data is securely transmitted and stored, complying with industry standards for encryption and privacy. The project emphasizes real-time authentication, user-friendly access control, and seamless IoT integration. A prototype was developed and tested, demonstrating high accuracy, reliable performance, and scalability for various smart home appliances. The system's implementation aims to improve security, convenience, and monitoring within the IoT ecosystem, offering significant advancements for smart home technology and user experience. Furthermore, the design considers sustainability by minimizing energy consumption, optimizing hardware efficiency, and promoting the use of environmentally conscious components to reduce the ecological footprint of smart systems.

2	**CPT 383**	20201962 20213313 20202565	Bayan Al-Bahri Maiyasa Al-Malki Malaak Al-Ghailani	IoT based Home Automation	Home automation and security enhancements are rapidly evolving due to the Internet of Things (IoT), transforming how we interact with our environment. This project presents the development and deployment of a smart home automation framework with a focus on intelligent parking systems, demonstrated using Cisco Packet Tracer simulation software. The proposed system aims to enhance homeowner convenience and security while promoting energy efficiency, reduced carbon footprints, and environmentally conscious technology adoption. This smart home solution integrates key features such as remote device control, real-time tracking, video surveillance, automatic breach detection, and intelligent parking management. These components not only enhance security and convenience but also contribute to sustainable urban living by reducing energy consumption, minimizing vehicle idling, and optimizing space usage in residential areas. Utilizing Cisco Packet Tracer, users can simulate interactions among IoT devices, routers, switches, and security systems. The framework incorporates scalable functionality, encryption technologies, robust authentication protocols, and anomaly detection systems to guard against cyber-attacks and unauthorized access.

					Connectivity is streamlined through IoT communication protocols such as MQTT and CoAP, ensuring compatibility and efficiency. Additionally, the system includes cloud integration features, enabling future scalability and business growth opportunities. By enabling virtual simulation and testing, the project also reduces the need for physical prototyping, cutting down on electronic waste and unnecessary resource use. This project provides hands-on experience in designing IoT networks, deploying smart systems, and implementing modern security measures. It ultimately aims to deliver a reliable and user-friendly smart home system with intelligent parking capabilities—meeting the evolving demands of modern homeowners for privacy, security, and sustainable smart living. The inclusion of smart energy management tools and intelligent scheduling within the system encourages more responsible energy usage and reduces environmental impact in everyday home operations.
3	**CPT 383**	20212991 20202403	Bhavesh Pahilajani Manaaf lamki	IoT-Based Intrusion Detection System (IDS) Using Machine Learning	With today's world highly reliant on Internet of Things (IoT) devices for everyday tasks, the number of connected endpoints has significantly increased—simultaneously expanding the attack surface vulnerable to cyber threats. Due to the inherent resource constraints present in IoT devices, conventional intrusion detection systems

		20213327	Yasser Al-Alawi		(IDS) are often not feasible for deployment within these environments. This thesis proposes the development of a lightweight, machine learning-based Intrusion Detection System designed specifically for resource-constrained IoT devices, with a primary focus on detecting Distributed Denial of Service (DDoS) attacks. By emphasizing computational efficiency and minimal energy consumption, the proposed system aligns with the principles of sustainable computing. The study evaluates three machine learning models for the IDS: Random Forest, Decision Tree, and K-Nearest Neighbor (KNN). These models are trained on a comprehensive dataset that includes 17 different DDoS attack types, alongside benign network traffic, to ensure diverse threat representation. Feature selection techniques are applied to isolate the most informative features, thereby reducing unnecessary computation and supporting faster, leaner model performance—contributing to lower power usage and more sustainable IoT device operation. Each model is rigorously assessed using key performance metrics including accuracy, F1-score, precision, recall, and ROC curve analysis, in alignment with industry standards. Among the evaluated algorithms, Random Forest achieved the highest accuracy (98.9%) but at the cost of greater

					computational demand. The Decision Tree algorithm provided a strong balance between accuracy (98.5%) and efficiency, making it highly suitable for IoT applications. Meanwhile, KNN demonstrated respectable performance (96.3%) but faced limitations due to higher latency and computational complexity. This thesis concludes that selecting machine learning algorithms with a balanced trade-off between accuracy and computational efficiency is essential for securing resource-constrained IoT environments. Such designs not only enhance security but also support long-term sustainability by reducing device energy consumption and extending hardware lifespans. The work contributes meaningfully to the field of IoT cybersecurity and demonstrates the feasibility of implementing lightweight IDS on real-world IoT systems. Future research will focus on real-time deployment, optimization, and further exploration of energy-aware security mechanisms to promote green computing in the IoT domain.
4	**CPT 383**	20201930	Amna Said Muhammed Alsaqri	Face Recognition Attendance System (Monitoring System)	This project emphasizes a sustainable and technologically advanced approach to attendance management by developing an automated attendance system powered by face recognition technology. Traditional attendance methods, often manual, are not only time-consuming and error-prone but also contribute to excessive paper usage

					and administrative inefficiencies. These outdated practices pose sustainability concerns related to resource consumption, carbon emissions from physical document processing, and long-term data management. To address these issues, the proposed system integrates artificial intelligence (AI), computer vision, and state-of-the-art tools such as OpenCV and YOLOv8 to accurately record attendance in real time. By eliminating paper-based processes, minimizing hardware dependency, and reducing energy-intensive administrative operations, this solution directly supports environmental sustainability while also ensuring high operational efficiency and accuracy. The project thoroughly explores components such as data collection and preprocessing, system architecture design, algorithm optimization, and the implementation of intelligent technologies. It prioritizes low-computation frameworks and efficient data handling to reduce energy consumption, aligning with green computing practices. Designed for scalable deployment in educational institutions and workplaces, this automated attendance system delivers a secure, eco-friendly, and user-centric alternative to conventional methods. It contributes to the United Nations' Sustainable Development Goals (SDGs),

					particularly Goal 9 (Industry, Innovation, and Infrastructure) and Goal 12 (Responsible Consumption and Production), by promoting digital transformation, reducing paper waste, and enabling responsible use of digital resources. Ultimately, this project not only modernizes attendance tracking but also serves as a model for integrating sustainability into everyday technological solutions.
5	**ISYS 4380**	20145179 20201975	Khalaf Al-Aisari Hajer Al-Harthy	Real Estate	This project presents the design and development of a Real Estate Fund System that supports investment operations through a digital platform, integrating financial performance with sustainable real estate practices. The system is designed to streamline the creation, management, and optimization of real estate investment funds, enabling rental income generation, capital appreciation through strategic property sales, and portfolio diversification. In addition to financial objectives, the project incorporates sustainability considerations, encouraging investment in energy-efficient buildings, eco-friendly construction, and properties aligned with environmental standards. The platform features robust modules for fund setup, investor profiling, capital tracking, and property management, all delivered through a secure, scalable, and user-friendly web interface. Real-time data analytics and visualization tools further enable fund managers to monitor market

					trends, assess property performance, and ensure compliance with both financial and environmental regulations. Using Oman's 2024 real estate market as a backdrop, the project evaluates trends such as increased demand in freehold zones, attractive rental yields, and growing investor interest in sustainable developments. Technical components include Gantt charts, use case diagrams, data flow diagrams, and entity relationship models to guide system implementation. By aligning technological innovation with sustainable investment strategies, the Real Estate Fund System enhances transparency, operational efficiency, and long-term value creation, while supporting global sustainability goals and responsible investment practices in the real estate sector.
6	**ICT 250**	20202662	Aisha Nasser Alkhrusia	TimeVo	TimeVo is a premier online platform tailored for watch collectors, connoisseurs, and enthusiasts who appreciate the elegance and heritage of fine watchmaking—now reimagined with a commitment to sustainability. Our mission is to offer a refined and environmentally conscious shopping experience through a thoughtfully curated selection of luxury timepieces from some of the world's most esteemed watch brands. By blending responsible sourcing, timeless design, and advanced digital technologies, TimeVo aims to set a new standard in the sustainable luxury watch market.

					At the heart of TimeVo lies a deep respect for craftsmanship, quality, and customer satisfaction—complemented by our dedication to environmental and ethical practices. Every watch featured on our platform is selected not only for its superior design, performance, and material but also for its longevity and ecological footprint. We prioritize timepieces crafted from durable and responsibly sourced materials, such as recycled stainless steel, ethically mined gold, and eco-conscious ceramic and sapphire crystal, supporting brands that embrace sustainable manufacturing processes. In addition to our premium offerings, TimeVo ensures a seamless and engaging online experience. With detailed product insights, high-resolution imagery, and personalized guidance—including AI-powered watch recommendations and live expert consultations—we empower our customers to make informed, lasting purchases. Our commitment to sustainability extends to our digital operations, including carbon-offset shipping and minimal packaging made from recyclable materials, aligning luxury with environmental responsibility. TimeVo's vision goes beyond commerce—we aspire to build lasting relationships rooted in transparency, trust, and shared values. We recognize that owning a luxury watch is not just a purchase, but a meaningful investment in artistry, legacy, and mindful consumption. Our secure platform supports global accessibility, ensuring that clients worldwide can experience the joy of owning a masterpiece with minimal environmental impact.

					Ultimately, TimeVo offers more than a collection of exquisite watches—it offers a conscious lifestyle choice. Each timepiece represents a legacy of excellence and a commitment to the future, allowing customers to own something that is not only beautiful and enduring but also respectful of our planet. Whether for special moments, everyday elegance, or heirloom collecting, TimeVo invites customers to embrace the art of sustainable luxury. In essence, TimeVo is not merely an online watch boutique—it is a destination for those who seek to celebrate horological artistry with integrity. With an exclusive collection, tailored services, and a clear focus on sustainability, TimeVo helps you discover a timepiece that can be treasured for generations to come—without compromising the future.
7	**ISEC 4399**	20202713 20188720	Roya Al Balushi Younis Al Balushi	Using Machine Learning for Predicting Lung Cancer Treatment Outcomes Based on Detection Models	This study involves designing a system based on a machine learning approach for the early diagnosis of lung disease using medical imaging. The model would be trained using various deep learning methods from a larger dataset of labelled lung images, each containing features related to the particular disease. We also hope to improve the accuracy of the diagnoses; decrease the rates of false positives and false negatives; and enable radiologists towards accurate timely diagnoses. Our approach covers end-to-end processing of the entire workflow starting with data collection, preprocessing, model development, and rigorous validation. Within these frameworks, the most

					advanced machine learning techniques will be embedded in the design and robustness enhancement in the scalability of the model. More importantly, our focus is in the integration of this technology into the clinical setting, right on course for enacting hospitals in the Sultanate of Oman. The deployment of our system in hospitals would mean less of a diagnostic burden on healthcare professionals, fewer unnecessary medical procedures, and improved patient outcomes. *Sustainability is also prioritized through the use of energy-efficient computational resources, optimized data processing pipelines, and eco-conscious implementation strategies that minimize the environmental impact of healthcare technologies.* This project advances medical AI research and innovative diagnostic technologies in the health care system of Oman.
8	**ISEC 4399**	20191066 20199933 20199930	Shahad Al Balushi Shaima Al Balushi	Harnessing Quantum Computing for Next-Generation Cybersecurity: Opportunities and Challenges	The rapid development in quantum computing threatens to break traditional cybersecurity frameworks. Quantum systems bring a new dimension in computational power that can render traditional methods of encryption obsolete. Given the current strides the Sultanate of Oman is making in digital transformation across industries, the project seeks to address the imminent need for quantum-resistant cybersecurity measures. With Oman increasingly dependent on digital infrastructures, the resilience of its cybersecurity framework becomes utmost important in

			Sheikha Al Mukhaini		government, financial, and healthcare services. Our presented project is offering a tailored solution by developing a quantum-safe cryptographic application using the BB84 quantum key distribution protocol, which is particularly designed for securing sensitive communications with the principles of quantum. One of the pioneering methods in quantum cryptography, the BB84 protocol is based on quantum states that create an encryption key that, by design, cannot be intercepted without being detected. The protocol depends on fundamental quantum mechanics—such as superposition and entanglement—to detect attempts at eavesdropping and hence offers strong protection for encrypted data. The application of these principles to generate secure, tamper-resistant encryption keys that will help in safeguarding highly critical digital assets of Oman has been built on and extensively tested using the ProjectQ framework. The application also underwent extensive simulation and iterative improvement in performance validation for its reliability during actual scenarios and adaptability across different sectors. The design is practical in embedding an interface that is user-friendly into the application, where credentials like login and message exchange will be encrypted. Monitoring is also done in real time, whereby users are alerted whether some anomaly occurred in data exchange. In this fashion, this would improve security not only of

					communications but also sensitive transactions. This project looks beyond the BB84 protocol to further complementary methods of post-quantum cryptography, namely lattice-based, code-based, and hash-based cryptography, adding extra layers of security with the aim of future-proofing Oman's cybersecurity infrastructure against possible quantum-enabled attacks. This project also contributes to Oman's national strategy for digital security and its ambition to become a leading player in regional cybersecurity innovation. In adding quantum-resistant cryptographic measures, Oman is protecting not only critical sectors but helping set a standard to which other countries can aspire as they navigate challenges posed by quantum advancements. *Additionally, the project considers sustainability by optimizing the computational efficiency of cryptographic operations, minimizing energy consumption during encryption processes, and encouraging the adoption of scalable, low-impact solutions that align with environmental best practices in the deployment of digital infrastructure.* Besides these, our research underlines the strategic collaboration, sharing of knowledge, and development of workforce in quantum technologies as utmost necessary for Oman in building a cybersecurity framework that is resilient and forward-looking.

					The essential difference this report provides is the roadmap to migration into quantum-resistant cybersecurity infrastructure. Complete with actionable insights and best practices, these are tailored for specific needs—for instance, Oman. With this work, Oman gets a bundle of tools, strategies, and expertise that the country needs to lock its digital landscape down against emerging quantum threats—sealing a secure and prosperous digital future that looks ahead at the quantum era.
9	**ISEC 4399**	20199916	Younis Yaqoob Ramadhan Al Balushi	Future-Proofing Cybersecurity: Challenges and Trends in Machine Learning-Based Threat Detection	In today's digital era, we confront several challenges relating to the security of our data, protection of our personal privacy, and well-being of our communities. This study digs into the interesting area of machine learning and its critical role and influence on our daily lives concerns. Our journey begins with a deeper look at how machine learning improves our cybersecurity defenses. We examine its ability to detect and counter cyber-attacks, focusing on shedding light on its position as a digital guardian for our sensitive data. As we go through the digital world, we encounter worries about the privacy of our personal information. Yet, we address the benefits of the implications of using machine learning algorithms while remaining committed to protecting individuals' privacy in our digital world. Next, we shift our focus to public safety, where machine learning is becoming a positive influence. We uncover the contributions of machine learning in detecting and preventing crimes, via real-world

					case studies and examples, to improve emergency response and ensure the well-being of our communities. Laws and regulations play an important role in guaranteeing ethical and secure operations in the ever-changing digital environment. We investigate the rules and policies governing data protection in machine learning, cybersecurity, privacy, and public safety. In addition, we examine the essential legal systems in Oman. We investigate existing applications of machine learning in many domains such as healthcare, banking, and transportation through a real-world lens. These applications demonstrate the real influence of machine learning in safeguarding our essential infrastructure and preserving our privacy. *Sustainability is also a core focus of this study, emphasizing the development of energy-efficient algorithms, responsible data handling practices, and the use of eco-friendly computational resources that reduce the environmental impact of AI-driven technologies.* This research also provides you with a large amount of information, datasets, and techniques relevant to machine learning, cybersecurity, privacy, and public safety. These materials enable you to get a better understanding of this topic. In conclusion, our exploration of the relationship of machine learning, cybersecurity, privacy, and public safety highlights the critical role that machine learning algorithms and technologies play in creating a safer and more secure digital future. It

					encourages further investigation and use of acquired knowledge to address the challenges and opportunities presented by our ever-changing digital environment.
10	**ISEC 4399**	20199814 20202166	Ahmed Al Ismaili Ammar Al-abdali	Leveraging SCADA Systems for Real-Time Flood Monitoring and Early Warning: A Case Study	Scada System which stans for (Supervisory Control and Data Acquisition), Scada System appeared and imposed itself on the life of man working factories. At the beginning of the ages, all factories and industrial facilities relied heavily on manpower, which reduced productivity because all the work was done manually. Systems were there in the beginning of the ages but all of them are often involved physical levers, switches, and valves that need workers to oversee operations in person. Manual control systems were groundbreaking in their day, but they had several drawbacks that reduced production and efficiency. Recognizing the contributions of manual control systems to industrial advancement is crucial as we move from manual control to digital automation. Understanding the drawbacks of conventional methods helps us to understand the improvements made possible by contemporary SCADA systems.

					We will also look at how SCADA systems are starting to replace manual control as a practical option, opening the door to increased productivity and creativity in industrial operations. Additionally, SCADA systems support sustainability by optimizing resource usage, reducing energy consumption, and minimizing waste through intelligent monitoring and control—contributing to more eco-friendly and sustainable industrial practices.