GLOBAL ACADEMY OF TECHNOLOGY
OPEN ELECTIVE - 7th SEM (2026-2027)

Sl. no	Program	Course	Course Code	Max Student Strength	Course Description	Restricted Programs from opting
1	PHY	Solar Cells: Materials and Design	PHY23705A	30	This course introduces the physics of solar cell materials and the recent developments in the design of solar cells. Solar energy conversion is the key to the electronic devices working on the renewable energy and the technological development are limited only by the suitable materials. This course focuses on the principles of solar energy conversion and the Materials concepts. The understanding of materials will enable the students to design and develop the energy supplies for large scale applications.	None
2	PHY	Dynamical Systems and Applications with Python	PHY23705B	30	This course introduces the dynamical systems and applications to understand the behaviour of the complex systems. The subject extends the scope of applications of differential equations and physics principles to solve the complex engineering problems, e.g., in socio-economic or healthcare areas. The course is suitable for the students of Engineering and Technology to understand the behaviour of the complex systems and model the problems in several areas of science and engineering. This course focuses on the use of python to model the dynamical systems and analyse their behaviour as the system evolves with time. The successful completion of the course will enable the students to solve complex engineering problems in interdisciplinary domains.	ISE, CSE(AIML)
3	AIML	Soft Computing	AML23705B	60	This course introduces the fundamental concepts and techniques of Soft Computing, an intelligent computing paradigm that mimics human reasoning and learning to solve complex real-world problems. It covers major soft computing methodologies such as Fuzzy Logic, Artificial Neural Networks, and Genetic Algorithms, focusing on their principles, architectures, and	ISE, AIML, CSE

					applications. The course emphasizes the design of intelligent systems capable of handling uncertainty, imprecision, and optimization challenges. Students will gain knowledge of computational intelligence techniques and their applications in decision-making, pattern recognition, control systems, and optimization problems across various engineering and industrial domains.	
4	AE	Drone Technology	ANE23705A	60	"Drone Technology is an interdisciplinary field that focuses on the design, operation, and application of Unmanned Aerial Vehicles (UAVs). This course introduces students to different types of drones, their history, configurations, and regulatory requirements under DGCA guidelines. Students learn the fundamentals of aerodynamics, including Newton's laws, Bernoulli's principle, and the forces acting on drones during flight. The course covers aerial platforms, drone configurations, and launch and recovery systems. It also provides knowledge of propulsion systems, including DC, BLDC, and servo motors, along with Electronic Speed Controllers (ESCs). Concepts such as payload calculation, speed control, and thrust-to-weight ratio are discussed. Students gain an understanding of battery technologies, charging circuits, and Battery Management Systems (BMS). The course further explores sensors such as accelerometers, gyroscopes, IMUs, tilt sensors, and LiDAR. The role of flight controllers and autopilot systems in drone navigation and stability is explained. Overall, the course equips students with the fundamental knowledge required for drone design, operation, and modern UAV applications. "	AE
5	AE	Space Technology	ANE23705C	60	This course provides a comprehensive understanding of space technology, rocket propulsion, orbital mechanics, satellite dynamics, and space mission operations. Students learn the fundamentals of space missions, launch vehicles, and rocket propulsion systems, including solid and liquid propellants. The course covers rocket trajectories, multistage rockets, sounding rockets, and orbital injection concepts. Atmospheric re-entry mechanisms such as ballistic, skip, and lifting-body re-entry are introduced. Students gain knowledge of orbital mechanics, including circular, elliptical, parabolic, and hyperbolic	AE

					orbits. Orbital maneuvers such as Hohmann transfer, plane changes, and propulsion requirements for spacecraft are discussed. The course explains satellite attitude dynamics and attitude control methods for spinning and non-spinning spacecraft. Concepts such as gravity-gradient stabilization, dual-spin satellites, and attitude determination are covered. Students also learn about ground trace analysis and mission planning. The course introduces space mission operations, ground support systems, mission phases, and team responsibilities. Overall, it equips students with the fundamental knowledge required for the design, operation, and management of space missions and spacecraft systems.	
6	CHE	Green Engineering and Sustainable Technologies	CHE23704	60	"Green Engineering and Sustainable Technologies introduces engineering students to the principles of environmental sustainability and green technological solutions. The course covers ecosystem dynamics, green chemistry, renewable energy resources, sustainable development, environmental pollution, and climate change. It also explores the role of emerging technologies such as nanotechnology in addressing environmental challenges, along with solid waste management practices and environmental legislation. The course equips students with the knowledge to develop sustainable and environmentally responsible engineering solutions for a greener future."	None
7	CSE(AIML)	Fundamentals of IOT	CML23705C	60	The Fundamentals of Internet of Things (IoT) open elective course introduces students to the concepts, architecture, technologies, and applications of IoT systems. The course provides an understanding of how physical devices, sensors, actuators, communication networks, and cloud platforms work together to enable smart and connected environments. Students gain knowledge of IoT protocols, data acquisition, processing, security, and real-world applications in domains such as healthcare, agriculture, smart cities, and industry. The course aims to develop the skills required to design and implement basic IoT solutions for modern technological challenges.	CSE, ISE, EEE, AIML, CSE(AIML)

8	Mathematics	Numerical Methods for Scientific Computation	BMAT23705A	120	"Numerical Methods for Scientific Computation", provides essential idea of mathematical and computational techniques widely used in engineering, science, data analysis, and research. The course equips students with practical skills to solve complex real-world problems where exact analytical solutions are difficult or impossible to obtain. Through topics such as error analysis, interpolation, numerical differentiation and integration, and numerical solutions of partial differential equations, students will develop problem-solving and computational thinking abilities. The course also includes experiential learning activities using Python or MATLAB, enabling students to gain hands-on experience in scientific computing. This elective is highly beneficial for students interested in higher studies, research, simulation, modeling, data science, and interdisciplinary engineering applications.	None
9	ECE	Wireless and Mobile Networks	ECE23705A	120	This course provides a comprehensive understanding of wireless communication technologies and modern wireless networking systems. It covers the principles, architectures, protocols, and standards of various wireless networks, including WBANs, WPANs, WLANs, WMANs, and WWANs. The course explores network design challenges, communication issues, and emerging wireless technologies. Students gain knowledge of ad hoc, sensor, mesh, and vehicular networks and their real-world applications. Emphasis is placed on analyzing wireless network performance and selecting appropriate technologies for different scenarios. The course prepares students to design, evaluate, and manage wireless communication systems for applications such as IoT, healthcare, smart transportation, and mobile communications. It also provides a strong foundation for advanced studies and careers in wireless networking and telecommunications.	ECE
10	ECE	Multimedia Communications	ECE23705D	60	This course introduces the fundamentals of multimedia communication systems and their applications. It covers how different media types such as text, images, audio, and video are represented in digital form, along with the principles of digitization and multimedia information processing. Students	ECE

					learn various compression techniques for text, images, audio, and video to efficiently store and transmit multimedia data. The course also explores Distributed Multimedia Systems (DMS), multimedia networking, multimedia operating systems, and the transport of multimedia content across communication networks. By the end of the course, students will understand multimedia technologies, compression methods, and the challenges of delivering multimedia services over modern networks.	
11	ISE	Digital Marketing and Automation	ISE23705D	180	This course introduces students to the evolving landscape of digital marketing, consumer behaviour, and marketing strategy in the digital age. Topics include digital marketing frameworks, value chain digitisation, data-driven marketing, and digital business models. Students examine strategy development encompassing internal assessment, objective planning, pricing models, and communication mix design. Campaign management covering intent-based and brand-based campaigns is explored in detail. The course concludes with digital service delivery, emerging digital business landscapes, and marketing automation tools, equipping students with practical skills to plan, execute, measure, and evaluate effective digital marketing campaigns across multiple channels.	ISE
12	ME	Additive Manufacturing	MED23705A	60	This course introduces the fundamentals of Additive Manufacturing (3D Printing), including its principles, processes, advantages, and comparison with conventional manufacturing methods. Students will learn about CAD data preparation, major AM technologies such as FDM, SLA, SLS, and SLM, and the selection of materials including polymers, metals, ceramics, and powders. The course also covers AM equipment, process parameters, industrial applications across various sectors, post-processing techniques, quality inspection, testing, and defect analysis, enabling students to understand and apply additive manufacturing in modern engineering applications.	ME

13	EEE	Electrical Energy Conservation and Auditing	EEE23705B	60	The course on Energy Management and Energy Audit offers a comprehensive understanding of energy concepts, national energy scenario, and practical strategies for efficient energy utilization. It equips students with essential knowledge of electrical energy management, energy auditing techniques, and conservation opportunities across systems such as motors, fans, lighting, buildings, and power plants. With a focus on real-world applications, policies like the Energy Conservation Act, and modern energy-saving technologies, this subject empowers learners to address critical challenges in energy security and sustainability. As an open elective, it is highly valuable for students from all disciplines who wish to develop awareness, analytical skills, and practical solutions for reducing energy consumption and promoting sustainable development.	EEE
14	EEE	Smart Internet of things	EEE23705C	60	Smart Internet of Things (IoT) is an interdisciplinary course that introduces students to the concept of connecting physical devices, sensors, and actuators to the internet for intelligent monitoring and control. The course covers IoT fundamentals, architecture, connectivity challenges, privacy concerns, and the role of big data in IoT systems. Students learn to interface various sensors such as temperature, humidity, motion, light, and gas sensors with microcontrollers like Arduino and ESP32. The course explores practical applications of IoT in smart homes, including automation, energy management, and security systems. It also examines IoT solutions for transportation systems such as connected vehicles and fleet management. Further, the subject focuses on smart city applications including smart lighting, traffic control, parking management, and water management systems. Overall, the course equips students with the knowledge and skills required to design, analyze, and implement modern IoT-based solutions for real-world applications.	EEE, ISE, CSE, CSE(AIML)
15	CSE	Foundation for Virtual and Augmented Reality Systems	CSE23705A	180	This course provides a comprehensive introduction to Augmented Reality (AR) and Virtual Reality (VR) technologies, focusing on their concepts, architectures, tools, and real-world applications. Students will explore the	CSE, AIML, CSE(AIML)

					fundamentals of immersive systems, including 3D graphics, tracking, sensing, display technologies, and human–computer interaction. The course covers the design and development of AR/VR applications using modern software frameworks and hardware platforms.	
16	AI&DS	Data Visualization Using Tableau and Power Bi	ADS237051	60	This course introduces the fundamentals of data visualization and its importance in effective decision-making. It covers visualization design principles, color theory, chart selection, and best practices for creating meaningful visualizations. Students learn data storytelling techniques using dashboards, storyboards, infographics, and KPIs while gaining hands-on experience with Tableau for data connection, preparation, analysis, and visualization. The course includes data extraction, joining, blending, sorting, field operations, calculations, functions, and Level of Detail (LOD) expressions. Students explore various filtering techniques, groups, hierarchies, sets, and create a wide range of charts, plots, maps, and interactive dashboards. Advanced topics such as forecasting, trend analysis, and formatting are covered, along with an introduction to Power BI, its architecture, visualization capabilities, and DAX functions for business analytics and reporting.	CSE, ISE, CSE(AI&ML), AIML, AI &DS
17	CIVIL	AI & ML in Infrastructure Engineering	CIV23705A	60	This course introduces the fundamental concepts of Artificial Intelligence (AI) and Machine Learning (ML) and their applications in civil and infrastructure engineering. The course covers the principles of machine learning, artificial neural networks, deep learning architectures, data collection and preprocessing techniques, feature engineering, and model development. Students will learn how infrastructure-related data obtained from sensors, monitoring systems, and engineering databases can be utilized to develop predictive and decision-support models. The course further explores deep learning methods such as convolutional neural networks and autoencoders for classification and feature extraction tasks. Emphasis is placed on real-world applications of AI and ML in structural engineering, transportation systems, geotechnical engineering, water resources engineering, construction management, structural health	CV

monitoring, damage assessment, traffic management, material modelling, and infrastructure performance evaluation. By the end of the course, students will be able to understand and apply AI and ML techniques to solve complex engineering problems, improve decision-making, and support the development of intelligent and resilient infrastructure systems.

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