ELECTIVE COURSE AWARENESS – SEMESTER VII

PROFESSIONAL ELECTIVE -4

COURSE TITLE: CLOUD & IOT SECURITY

COURSE CODE: 22CS4706

CREDITS: 3 | **HOURS/WEEK**: 3 | **TOTAL HOURS**: 39

OFFERED BY: DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DR.GOKULAKRISHNAN.S

ESSENCE OF THE SUBJECT

The **Cloud & IoT Security** course introduces students to the **foundational and advanced concepts of security** in two rapidly growing areas of technology: **Cloud Computing** and the **Internet of Things (IoT)**.

This course emphasizes:

- The **principles of cybersecurity** applied specifically to **cloud services and IoT environments**.
- Identifying and mitigating **security threats**, vulnerabilities, and attack vectors.
- Developing skills to **design and implement secure systems** using real-world applications and case studies.
- Understanding **industry-relevant tools and techniques** like identity and access management, encryption, and secure communication protocols.

WHY STUDY THIS SUBJECT?

This course is essential because:

- The world is becoming **increasingly cloud-dependent** (think AWS, Azure, Google Cloud) and **IoT-integrated** (smart homes, wearables, autonomous vehicles).
- Security breaches in cloud platforms or IoT devices can lead to **data loss, privacy violations, or system failures**.
- There’s a high demand for professionals who **understand the specific challenges** of securing these platforms.
- It bridges the gap between **theoretical cybersecurity** and **practical implementations** in today's interconnected systems.

FUTURE SCOPE & CAREER PERSPECTIVE

Students who complete this course will be well-positioned for roles such as:

- **Cloud Security Analyst**
- **IoT Security Engineer**
- **Cybersecurity Consultant**
- **DevSecOps Engineer**
- **Security Operations Center (SOC) Analyst**

FUTURE SCOPE & CAREER PERSPECTIVE

It also forms a **strong foundation for advanced certifications**:

- AWS Certified Security – Specialty
- Certified Information Systems Security Professional (CISSP)
- Certified Cloud Security Professional (CCSP)
- Cisco IoT Security Specialist

In terms of **further study**, it aligns with domains in:

- M.Tech in Cybersecurity
- MS in Cloud Computing & Security
- Specialized certifications and postgraduate diplomas in IoT/Edge Security

TOPICS COVERED (MODULE OVERVIEW)

Unit I: Cloud Security Fundamentals

- Threat actors, cloud service models, risk management, asset classification & protection.

Unit II: Identity & Access + Vulnerability Management

- Lifecycle of IAM, case studies in web and microservice applications.

Unit III: Encryption and Threats in Cloud

- Encryption at rest and in transit, secrets management, detecting breaches, IAM flaws.

Unit IV: IoT Security Architectures

- IoT models, enabling technologies, authentication, authorization, and communication security.

Unit V: IoT Applications & Integration with Cloud

- Real-world use cases like smart grids, smart cities, data analytics, AWS IoT.

GENERAL PREREQUISITES

To take this course effectively, it is **recommended** (though not mandatory) to have:

- Basic understanding of **computer networks** and **security principles**.
- Familiarity with **cloud platforms** such as AWS, Azure, or GCP.
- Programming knowledge in **Python, Java, or C**.
- Prior exposure to courses like **Computer Networks**, **Operating Systems**, or **Cybersecurity Basics** is helpful.

REAL-WORLD APPLICATIONS

- **Smart Cities**: Securing traffic sensors, public Wi-Fi, surveillance systems.
- **Healthcare IoT**: Protecting wearable medical devices and patient data.
- **Industrial IoT (IIoT)**: Managing risks in factory automation systems.
- **Cloud Infrastructure Security**: Implementing encryption, IAM, and threat detection on platforms like AWS and Azure.

ELECTIVE REGISTRATION INFO

📌 **Elective course registrations will be done via the ERP portal.**

ELECTIVE COURSE AWARENESS – SEMESTER VII

PROFESSIONAL ELECTIVE -5

COURSE TITLE: HUMAN COMPUTER INTERFACE (HCI)

COURSE CODE: 2CS4717

CREDITS: 3 | **HOURS/WEEK**: 3 | **TOTAL HOURS**: 39

OFFERED BY: DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DR.GOKULAKRISHNAN.S

ESSENCE OF THE SUBJECT

The **Human Computer Interface** (HCI) course explores how humans interact with computers and how to design user interfaces that are **intuitive, efficient, and accessible**. This subject blends **psychology, design, and computing** to create systems that align with user needs and behaviors.

You'll learn:

- Theories and models of human cognition and interaction
- Design principles for user-friendly systems
- Prototyping, user testing, and usability engineering
- Modern trends such as **mobile UI**, **game development interfaces**, and **conversational agents**

WHY STUDY THIS SUBJECT?

- Almost **every application or system** today has a user interface — making HCI essential across all domains.
- Good design can **make or break a product** — think about the simplicity of Google or the complexity of legacy software.
- HCI equips you with the **skills to design interactive systems** that are functional and enjoyable to use.
- It merges **technical and creative thinking**, preparing you for a wide variety of roles in the tech industry.

FUTURE SCOPE & CAREER PERSPECTIVE

Studying HCI opens doors to:

- **UI/UX Designer**
- **Interaction Designer**
- **Human Factors Engineer**
- **Game UI Developer**
- **Usability Analyst**
- **Front-end Developer**
- **Mobile App Designer**

FUTURE SCOPE & CAREER PERSPECTIVE

Higher Studies & Certifications

- MS in Human-Centered Design, UX Design, or HCI
- Certifications: Google UX Design, Nielsen Norman Group HCI Certificates

TOPICS COVERED (MODULE OVERVIEW)

Unit I: Fundamentals

- Human cognitive models, ergonomics, paradigms, and evolution of HCI.

Unit II: Design Principles & Usability

- Software lifecycle in HCI, prototyping, Norman's model, Nielsen's heuristics.

Unit III: Game Development Foundations

- Using Unity: texture importing, lighting, mesh configuration, prefab creation.

Unit IV: Interaction and Event Handling

- Notifications, player control logic, event-driven programming.

Unit V: Object-Oriented Interaction

- AI elements in gaming (enemy behavior), cameras, animation, and enemy logic.

GENERAL PREREQUISITES

To benefit fully from the course, you should:

- Have basic programming knowledge (preferably **C#**, **Python**, or **JavaScript**)
- Understand the basics of **software development lifecycles**
- Have an interest in **design**, **user psychology**, or **visual systems**
- Some familiarity with **Unity Game Engine** is helpful but not mandatory

KEY FEATURES OF THE COURSE

- Case studies based on popular apps
- Design guidelines from industry experts
- Activities involving **real-world interface problems**
- Integration of **mobile-first** and **responsive design** concepts
- Blend of theory + practical UI/UX design sessions

REAL-WORLD APPLICATIONS

Application Area	Real-Time Use Cases
🎮 **Game Development**	Designing immersive UIs in Unity, first-person controllers, handling in-game interactions
📱 **Mobile App Design**	Responsive GUI design, intuitive navigation, gesture controls
🏥 **Healthcare Systems**	User-friendly hospital interfaces for patient data, voice-assisted diagnostics
🌇 **Smart Devices**	Human-centered control interfaces for smart homes, wearables
🚗 **Automotive UX**	Touch and voice interfaces in connected cars
👓 **AR/VR**	Creating 3D interactive environments with natural gestures
💬 **Conversational Interfaces**	Chatbots and voice assistants (e.g., Alexa, Siri) built with HCI design

ELECTIVE REGISTRATION INFO

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