Harare Institute of Technology
HIT
Success through Innovation

**School of Information Sciences & Technology**
**Computer Science Department**

ICC 7220: Cloud Application Development

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# Course Outline

## Course Learning Outcomes

Upon completion of the course, students are expected to be able to:

- Understand the fundamental aspects of cloud application development.
- Develop and deploy Microservices for cloud.
- Build APIs for cloud service providers
- Follow the DevOps practices for software development.
- Build application pipelines using the CICD model.

## Unit 1: Cloud Based Applications

- Traditional Software vs Cloud Based Software
- Understanding Cloud Ecosystem (SaaS and PaaS)
- Public vs Private Cloud Apps
- Building Scalable and Resilient Applications
- Load balancing and auto-scaling
- Fault tolerance and high availability

## Unit 2: Implementing Micro services

- Microservices architecture principles
- Serverless computing concepts
- Client to microservices communication
- Interservice communication
- microservices hosting platform options

## Unit 3: Introduction to APIs

- Introduction: API economy, APIs in public sector.
- API Strategy and Architecture: API Strategy, API value chain, API architecture, API management.
- API Development: Considerations, Standards, kick-start API development, team orientation.
- API Gateways: API Gateways in public cloud, AWS API gateway.
- API Security: Request-based security, Authentication and authorization.

## Unit 4: DevOps Essentials

- DevOps introduction, Problem and solution.
- DevOps principles and practices
- CI/CD pipeline for cloud applications
- Infrastructure as Code (IaC) and configuration management

**Unit 5: Application Development Frameworks**

- Cloud Application Development Platforms
- Introduction to Application Development Frameworks
- Understanding the MVC architectural pattern
- Testing and Deployment in Frameworks
- Framework selection and best practices

**Text books: -**


1. Building Microservices Applications on Microsoft Azure Designing, Developing, Deploying, and Monitoring — Harsh Chawla Hemant Kathuri
2. https://github.com/indrabasak/Books/blob/master/Kubernetes%20in% 20Action.pdf.
3. Agile Project Management with Azure DevOps: Concepts, Templates, and Metrics 1st ed. Edition, by Joachim Rossberg, Publisher: Apress
4. Rajkumar Buyya, James Broberg, Andrzej Goscinski, *"Cloud Computing Principles and Paradigms"*. Wiley Publishing Inc. 2010.