## KyU/F/ASA/02

## SCHOOL OF PURE & APPLIED SCIENCES

**COURSE OUTLINE**

**(-----------------------------------------------)**

**DEPARTMENT:** PURE & APPLIED SCIENCES

**PROGRAMME:** BSC SE **YEAR:** IV

## SPE 2409 FUTURE TRENDS IN SOFTWARE ENGINEERING

(45 Contact Hours)

**Pre-Requisite**: ALL

**1.0 COURSE PURPOSE**

To examine the current and future directions in research in the area of Software Engineering

**2.0 LEARNING OUTCOMES**

By the end this course, the student should be able to:

        i.            Explain the current interests in Software Engineering

      ii.            Assess the future research directions in the field

   iii.            Discuss to moderate levels of details these trends

**3.0 COURSE OUTLINE**

|  |  |  |  |
| --- | --- | --- | --- |
| **Week** | **Topic** | **Sub-Topic** | **Comments** |
| 1 | **Introduction to Future Trends in SE** | 1. **Overview of Software Engineering** 2. **Importance of Keeping Up with Emerging Trends** 3. **Course Objectives and Expectations** 4. **Industry Relevance and Evolution** |  |
| 2 | **Artificial Intelligence and Machine Learning** | 1. **AI in Software Development** 2. **Machine Learning Models and Techniques** 3. **Ethical Considerations in AI-Driven Development** |  |
| 3 | **Cloud Computing and Edge Computing** | 1. **Overview of Cloud vs. Edge Computing** 2. **Serverless Architecture** 3. **Emerging Trends in Cloud Security** |  |
| 4 | **DevOps and Continuous Integration/Continuous Deployment (CI/CD)** | 1. **Principles of DevOps** 2. **Automation and CI/CD Pipelines** 3. **Scaling DevOps Practices in Distributed Environments** | **Assignment 1** |
| 5 |  | **Assignment Presentations** | **CAT 1** |
| 6 | **Internet of Things (IoT) and Embedded Systems** | 1. **IoT Architecture and Use-Cases** 2. **Challenges and Future Trends in IoT Security** 3. **Integration of IoT with AI/ML** |  |
| 7 | **Blockchain and Distributed Ledger Technology** | 1. **Blockchain Fundamentals** 2. **Smart Contracts and Decentralized Applications (dApps)** 3. **Future Trends in Blockchain-Based Systems** |  |
| 8 | **Cybersecurity in Software Engineering** | 1. **Emerging Cybersecurity Threats** 2. **Privacy-Preserving Techniques** 3. **Blockchain in Cybersecurity** |  |
| 9 | **Quantum Computing and Software Engineering** | 1. **Basics of Quantum Computing** 2. **Impact on Software Development** 3. **Quantum Algorithms and Software Tools** | **Assignment 2** |
| 10 |  | **Assignment II Presentations** | **CAT 2** |
| 11 | **Software Engineering for Virtual Reality (VR) and Augmented Reality (AR)** | 1. **VR/AR Technologies and Development Frameworks** 2. **Challenges in Immersive Software Development** 3. **Future Trends in Interactive Experiences** |  |
| 12 | **Sustainable Software Engineering** | 1. **Green Coding Practices** 2. **Sustainability in Cloud Computing** 3. **Circular Economy and Software Development** |  |
| 13 | **Software Engineering for Artificial General Intelligence (AGI)** | 1. **AGI Research Overview** 2. **Challenges and Future Developments in AGI** 3. **Ethical Implications of AGI in Software Systems** |  |
| 14 |  | Summary & Review |  |
| 15 - 16 | Final Examination |  |  |

**4.0 TEACHING METHODOLOGY**

Lectures, directed reading, practical demonstrations of communication services, and hands-on laboratory sessions and projects.

**5.0 INSTRUCTIONAL MATERIALS**

LCD projectors, computers, white boards, appropriate software

**6.0 COURSE EVALUATION**

**Type Weighting (%)**

Continuous Assessment Test 30 %

Examination 70 %

Total 100%

**7.0 COURSE TEXT BOOKS**

1.      [D.A.Godse A.P.Godse](http://books.google.co.ke/ebooks?output=ws2&as_brr=5&q=inauthor%3A%22D.A.Godse%20A.P.Godse%22&hl=-1136031363" \t "_blank) - Jan 1, 2008, Advanced Microprocessors And Microcontroller ISBN – 9042655094

2.      Eds. Sajja & Akerkar. (2010). Advanced Knowledge Based Systems: Model, Applications & Research.

3.      [Zhongzhi Shi](http://books.google.co.ke/ebooks?output=ws2&as_brr=5&q=inauthor%3A%22Zhongzhi%20Shi%22&hl=-1136031363" \t "_blank) – 2011, [Advanced Artificial Intelligence](http://books.google.co.ke/books?id=wNbMOoTuGU0C&source=gbs_similarbooks) ISBN=2340717931

**8.0 REFERENCE TEXT BOOKS**

1.      Deitel, H.M. & Deitel, P.J. (2005). Advanced Java 2 Platform how to program, PrenticeHall, Inc. Upper Saddle River, New Jersey, ISBN: 074-5867846

2.      Margaret H. Dunham (2003). Data Mining: Introductory and Advanced Topics. Prentice Hall. ISBN-10: 0130888923

**9.0 COURSE JOURNALS**

1.      Advances in Computational Mathematics ISSN 1019-7168

2.      Advances in data Analysis and Classification ISSN1 1862-5347

3.      Annals of software Engineering ISSN 1022-7091

**10.0 REFERENCE JOURNALS**

1.      Journal of computer science and Technology ISSN 1000-9000

2.      Central European Journal of Computer Science ISSN 1896-1533

3.      Cluster computing ISSN 1386-7857