MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

Course outline

CCU 3150: Integrated Thinking in Computing

This course aims to equip students with a holistic approach to problem-solving and innovation in computing through the integration of systems thinking, logical and critical thinking, and design thinking. It prepares students to tackle complex challenges in technology by fostering a multidisciplinary mindset.

Expected Learning Outcomes:

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

1. Apply systems thinking principles in computing contexts.
2. Develop logical and critical thinking skills to analyze and solve problems.
3. Utilize design thinking methodologies to create innovative solutions.
4. Integrate multiple perspectives and approaches to address complex issues.
5. Communicate effectively and collaboratively in multidisciplinary teams.

Course content	
Week	Content
Week one	**Introduction to Integrated Thinking** • Definitions and importance of integrated thinking, • Overview of systems thinking, • Logical and critical thinking, • Design thinking, • The role of integrated thinking in computing.
Week two	**Group formation and problem identification. Case studies selection**
Week three	**Systems Thinking in Computing** • Principles of systems thinking, • System components, relationships, and boundaries, • Applying systems thinking to technological problems
Week four	**Group work and presentation of problem statement, feasibility study, scope and design**
Week five	**Logical and Critical Thinking** • Fundamentals of logic and reasoning, • Critical thinking processes and techniques, • Problem-solving strategies and decision-making in computing.
Week six	**Design Thinking Fundamentals;**

	• Introduction to design thinking, • The design thinking process: empathize, define, ideate, prototype, test, • Tools and techniques for design thinking.
Week seven	**Seat in CAT**
Week eight	**Integrating Systems, Logical, and Design Thinking;** • Case studies of integrated thinking in technology, • Collaborative problem-solving and innovation, • Balancing analytical and creative approaches.
Week nine	**Practical Applications of Integrated Thinking;** • Real-world applications and project-based learning, • Developing and presenting integrated solutions, • Evaluating the effectiveness and impact of integrated approaches.
Week ten	**Group work reporting on project implementation**
Week eleven	**Communication and Collaboration;** • Effective communication skills for integrated teams; • Techniques for fostering collaboration and teamwork; • Managing interdisciplinary projects and challenges.
Week 12	**Group presentation report on results and future work recommendations. This will be panel presentations with panelists made up of the SCI lecturers.**
Week 13	

Mode of Delivery:

- Lectures
- Tutorials
- Independent study
- Group discussions

Course Assessment:

Type	**Weighting (%)**
Continuous Assessment	
• Continuous Assessment (Quizzes, Participation, and Collaboration)	20
• Systems Thinking Analysis Exercise	20
Sub Total	**40**

Project Assessment

• Logical and Critical Thinking Problem Solving	20
• Design Thinking Project	20
• Integrated Case Study Analysis and Presentation	20
Total	**100**

Core Reading Material:

1. Paul S. Wang: From Computing to Computational Thinking. CRC Press, 2015. ISBN: 9781482217650
2. Peter J. Denning, Matti Tedre: Computational Thinking. MIT Press, 2019. ISBN: 9780262536561

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