Debre Markos University, Institute of Technology
School of Computing

Course Title: Introduction to Emerging Technologies
Credit Hours: 3(2Hr. lecture & 3Hr Lab/Tutorial /Seminar)
Course Code: EmTe1012
Target Group: 1st Year Students
Learning outcome: By the end of this course the student will able to:

- Identify different emerging technologies
- Differentiate different emerging technologies
- Select appropriate technology and tools for a given task
- Identify necessary inputs for application of emerging technologies

Course Description: This course will enable students to explore current breakthrough technologies in the areas of Artificial Intelligence, Internet of Things and Augmented Reality that have emerged over the past few years. Besides helping learners become literate in emerging technologies, the course will prepare them to use technology in their respective professional preparations.

Course Content:

Chapter 1: Introduction to Emerging Technologies

- Evolution of technologies
- Role of data for Emerging technologies
- Enabling devices and networks for emerging technologies (programmable devices)
- Human to Machine Interaction
- Future trends in emerging technologies

Chapter 2: Introduction to Data Science

- Overview for Data Science (Definition of data and information and Data types and representation)
- Data Value Chain: Data Acquisition, Data Analysis, Data Curating, Data Storage, Data Usage
- Basic concepts of Big data

Chapter 3: Artificial Intelligence (AI)

- Introduction to AI (What is AI, History of AI, Levels of AI, Types of AI)
- Applications of AI: Agriculture, Health, Business (Emerging market), Education
- AI tools and platforms (e.g.: scratch/object tracking)
- Sample application with hands on activity (simulation based)

Chapter 4: Internet of Things (IoT)

- Overview of IOT (What is IOT, History of IOT, Advantages of IOT, Challenges of IOT)
- How IOT works: Architecture of IOT, Devices and network
- Applications of IOT: Smart home, Smart grid, Smart city, Wearable devices, Smart farming
- IOT tools and platforms (e.g.: KAA IoT /Device Hive/Zetta/Things Board…)
- Sample application with hands on activity (e.g. IOT based smart farming)

Chapter 5: Augmented Reality (AR)

- Introduction to AR
- Virtual reality (VR), Augmented Reality (AR) vs mixed reality (MR)
- Architecture of AR systems.

- Application of AR systems (education, medical, assistance, entertainment)

Chapter 6: Ethics and professionalism of emerging technologies

- Technology and ethics
- Digital privacy
- Accountability and trust
- Treats and challenges

Chapter 7: Other emerging technologies

- Nanotechnology, Biotechnology, Blockchain technology, Cloud and quantum computing, Autonomic computing, Computer vision, Embedded systems, Cyber security, Additive manufacturing (3D Printing)

Teaching Methods: Lecture, Laboratory, Tutorial, Group Discussion

Assessment Method:

- Test (Chapter One 1, 2 and 3 – 30%),
- Lab Exam (10%),
- Assignment (10%) and
- Final (50%)

Reference:

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9. Khaled Salah Mohamed, The Era of Internet of Things: Towards a Smart World, Springer, 2019.
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16. Sven Ove Hansson, The Ethics of Technology: Methods and Approaches, 2017