Program Content

Semester	VI		
Course Code:	EN6106		
Course Name:	Emerging Topics in Information Technology		
Credit Value:	2 (1L + 1P)		
Core/Optional	Core		
Hourly Breakdown	Theory	Practical	Independent Learning
	15 Hrs	30 Hrs	55 Hrs

Course Aim:

- This module will provide an overview of some emerging Information Technology topics.

Intended Learning Outcomes:

Upon completion of this course, students will be able to do the following:

- LO1. Identify the range of disciplines to which Information Technology is applicable
- LO2. Develop new skills related to the topics covered in this module.
- LO3. Apply newly learned skills and develop IT applications related to those topics.

Course Content: (Main Topics, Sub topics)

Topic	Theory (Hrs)	Practical (Hrs.)
1. Microservices	2	6
2. Data Science with Python	3	4
3. Artificial Intelligence	4	8
4. Social Network Analysis	2	4
5. Digital Forensics	2	4
6. Extended Reality	2	4
Total	**15**	**30**

1. Microservices (2 hours) [Ref1]

1.1. Monolithic Systems, Service Oriented Architecture
1.2. Introduction to Micro Services
1.3. Key Benefits and Challenges
1.4. Design Patterns
Practical - Simple Microservice Application using Spring Boot

2. Data Science with Python (3 hours) [Ref 2]

2.1. Introduction to Data Science and Data Engineering
2.2. Data Engineering Pipeline and Infrastructure
2.3. How Data Driven Insights can be Applied in Different Fields
2.4. Using Data Science to Extract Meaning from Data
2.5. Data Visualization
Practical – Data Science Tutorial Using python

3. Artificial Intelligence (4 hours) [Ref 3]

3.1. What is Artificial Intelligence
3.2. Usages of AI in Society
3.3. Software Based AI Applications
3.4. AI in Hardware based Applications
3.5. Future of AI
Practical - Agent Based modeling using NetLogo

4. Social Network Analysis (2 hours) [Ref 4]

4.1. Introduction to Social Networks
4.2. Goals of Analysis
4.3. Variables and Relations
4.4. Mathematical Foundations
4.5. Data Collection
4.6. Data Management
4.7. Multivariate Analysis
4.8. Visualizations
Practical - Social Network Analysis using Python and NetworkX Library

5. Digital Forensics (2 hours) [Ref 5]

5.1. Forensic Science
5.2. Introduction to Digital Forensics
5.3. Identification Phase
5.4. Collection Phase
5.5. Examination Phase
5.6. Analysis Phase
Practical – Digital Forensics tutorial with Python

6. Extended Reality (2 hours) [Ref 6]

6.1. Introduction to Extended Reality
6.2. Reality Virtuality Continuum
6.3. Comparison between AR/VR/AV
6.4. Applications of Augmented Reality
6.5. Applications of Virtual Reality
6.6. Applications of Augmented Virtuality

Practical - Web-based AR app development tutorial with WebXR

Teaching /Learning Methods:

You can access all learning materials and this syllabus in the VLE: http://vle.bit.lk/, if you are a registered student of the BIT degree program.

Assessment Strategy:

Continuous Assessments/Assignments:

In the course, case studies/Lab sheets will be introduced, and students have to participate in the learning activities.

Final Exam:
The final examination of the course will be held at the end of the semester. This course is evaluated using a one-hour written question paper which consists of 25 MCQs. To obtain a "PASS" grade for the course, a student MUST get at least 50 marks out of 100 for the MCQ written question paper.

References/ Reading Materials:

- Teacher's notes on each topic will be provided as a reference material.
- **Ref 1.** Spring Microservices, https://spring.io/microservices
- **Ref 2.** W3School Data Science Tutorial, https://www.w3schools.com/datascience/default.asp
- **Ref 3**. NetLogo multi-agent programmable modeling environment.**,** http://ccl.northwestern.edu/netlogo/index.shtml
- **Ref 4.** Aric Hagberg, Dan Schult, Pieter Swart, 2021**,** NetworkX Reference, https://networkx.org/documentation/stable/_downloads/networkx_reference.pdf
- **Ref 5.** Swathi Sree, Python Digital Forensics Tutorial, https://www.scribd.com/document/393851066/Python-Digital-Forensics-Tutorial
- **Ref 6.** Marius Noreikis, 2020, Web-based AR app development tutorial with WebXR, https://www.devbridge.com/articles/ar-app-development-tutorial/