UNIVERSITY OF HARGEISA

COLLAGE OF ENGINEERING, COMPUTING AND IT

COURSE OUTLINE

Course Title		**Selected Topics in Computer Science**
Course Code		**~~CS401~~**
Degree Program		Faculty of Computing and IT
Course Instructor Name		Suleiman M. A. Gargaare
Instructor's contact information		Phone: +252 63 4127539 E-mail: suleiman.gargaare@yahoo.com
Contact Hours (per week)		3
Course Objectives		Upon completing this course, students will be able to: 1. **Master Python-Based AI Tools**: Gain proficiency in utilizing Python libraries and resources for artificial intelligence development, enabling the creation of intelligent systems and solutions. 2. **Explore Artificial Intelligence Domains**: Comprehend the scope, significance, and diverse application areas of artificial intelligence across industries and research fields. 3. **Address Natural Language Processing Challenges**: Analyze and resolve complex issues in natural language processing, applying techniques to interpret and generate human language effectively.

		4. **Solve Computer Vision Problems**: Develop skills to design and implement solutions for image processing and computer vision tasks using relevant algorithms and methodologies. 5. **Understand Deep Learning and Neural Networks**: Acquire a solid grasp of the concepts, architectures, and algorithms driving deep learning and neural networks, with practical applications in AI systems. 6. **Comprehend Blockchain Technology**: Understand the foundational principles, mechanisms, and potential applications of blockchain technology in secure, decentralized systems.
Course Description		Selected Topics in Computer Science is an advanced course exploring Python Resources in AI, Natural Language Processing, Computer Vision, and Blockchain Technology. Designed for senior students, it covers theoretical foundations, practical applications, and key algorithms in these dynamic fields. Through lectures and hands-on exercises, students master Python AI libraries, tackle language processing and image analysis challenges, and understand deep learning, neural networks, and blockchain principles. This course prepares students to innovate and solve real-world problems in artificial intelligence and decentralized systems.
Pre-requisites		Artificial Intelligence, Probability, Statistics and Linear Algebra.

Schedule

Week	Date	Topics and sub-topics	Activity
1 - 2		**Topic 1: Python-Based AI Tools** Chapter 1. Introduction	**Discussion**
3 - 4		Chapter 2. Unravelling the Python Resources of AI	
5 - 6		**Topic 2: Natural Language Processing** Chapter 3. Morphology, Syntax and Semantics	**Quiz I**

7 - 8		Chapter 4. Tokenization, Lemmatization and Stemming	
9 - 10		Chapter 5. Context Free Grammar and POS Tagging	
MID EXAM			
11 - 12		**Topic 3: Image Processing (Computer Vision)** Chapter 6. Image Enhancement	**Group Assignment**
13 - 14		Chapter 7. Morphological Image Processing	
15 - 16		Chapter 8. Image Segmentation	
16 - 17		**Topic 4: Introduction to Blockchain Technology** Chapter 9. Blockchain Basics & Cryptography	**Presentation**
	STUDY WEEK		
	FINAL EXAM		
Assessment	**Continues assessment** Midterm ……..……..20% Attendance…..…….……..5% Quiz…….…….…….5% Group Assignment…….....10% Final exam……...…….....…60% Total…….....100%		
Text-Books	1. Natural Language Processing with Python by Steven Bird, Ewan Klein and Edward Loper. 2. Programming Computer Vision with Python Jan Erik Solem. 3. Programming the Open Blockchain, 2nd Edition by Andreas M. Antonopoulos.		