Course title	**Generative Artificial Intelligence (AI)**				
Course code	**BIMA-367**				
Course type	**Elective**				
Level	**1st Cycle**				
Year / Semester	**3rd**				
Teacher's name	**Dr C. G. Christou**				
ECTS	6	**Lectures / week**	12	**Laboratories / week**	
Course purpose and objectives	The main objectives of the course are to: • Familiarise students with AI tools which can help them create digital art, multimedia story narratives, and computer-generated videos • Discuss the history of AI and in particular machine learning and it applications. • Introduce core concepts of neural networks and how they can be used in classification and recognition of visual content. • Introduce Large-scale Language models and the basics of transformer models and how they can be trained and used for language and digital content creation. • Explore different applications (web based and opensource) which can be used for digital arts. • Explain how to use open-source software such as StableDiffusion, ComfyUI in conjunction with appropriate trained models such as Flux for text to image and text to video creation. • Explore how generative AI systems can be used for generating story narratives.				
Learning outcomes	After completion of the course students are expected to be able to: 1. Define fundamental concepts and terminology of generative AI, including key neural network architectures used in text, image, and video generation 2. Explain the operational principles of trained generative AI models and distinguish between various model architectures and embedding techniques 3. Construct effective prompts for generative AI systems to produce specific outputs in text, image, and video formats. 4. Use appropriate generative AI tools and techniques to solve content creation challenges.				

	5. Dissect the components and mechanisms of different generative AI techniques. 6. Compare the effectiveness of various generative AI approaches for different content types. 7. Evaluate the progression of generative AI technology and its implications for current practices. 8. Analyze the ethical implications and societal consequences of generative AI applications. 9. Create original content using generative AI tools, applying appropriate models and prompting strategies. 10. Formulate innovative solutions to complex content generation challenges using AI technologies.		
Prerequisites	BIMA-160	**Required**	BIMA-360, BIMA-365
Course content	About introduction to how neural networks work and the history of machine learning. Large scale language models, vision transformers and multimodal models for digital arts. Introduction to Generative AI. Overview of Generative Models: ChatGPT, StableDiffusion, MidJourney, Dall-E. Introduction to Embeddings. Prompt Engineering Basics. Text-to-Image Synthesis Image-to-Image Translation. Advanced Prompt Engineering (ControlNet, Openpose). Generative story narratives using AI. AI Video Generation. Ethical Considerations in Generative AI		
Teaching methodology	Lectures, Lab Presentations, Lab Tutorials, Practical Exercises and Assignments.		
Bibliography	**Books:** 1. Foster, D. (2019). Generative Deep Learning. Teaching Machines to Paint, Write, Compose and Play (2019). *Beijing-Boston-Farnham-Sebastopol-Tokyo, OREILLY*, 330. **Websites:** 6. OpenAI Blog A great resource for staying updated with the latest developments in the field of AI, including advancements in generative models. 7. DeepAI A platform that offers various AI tools and APIs, including those for image synthesis, which can be useful for hands-on projects. 8. Towards Data Science A Medium publication that features articles on various topics in data science and AI, including tutorials and case studies on generative AI. 9. Distill An online journal that publishes clear and visually engaging articles on machine learning and AI topics. 10. GitHub A platform where you can find open-source projects and code repositories related to generative AI, which can be useful for hands-on learning and project development.		

Assessment	Class attendance and performance, assignment and practical projects.
Language	English