

**LEVEL 5 HIGHER INTERNATIONAL DIPLOMA IN
ARTIFICIAL INTELLIGENCE**

CURRICULUM FOR ARTIFICIAL INTELLIGENCE BASED ON CREDIT SYSTEM

PROGRAMME LEARNING OUTCOMES (PLO):

- I. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- II. Problem analysis Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- III. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- IV. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions Manage Construction Projects for Planning, Analyzing, Costing, Scheduling, Predicting and complete within the stipulated period and fund.
- V. Modern tool usage Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- VI. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- VII. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development, Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- VIII. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design

documentation, make effective presentations, and give and receive clear instructions.

- IX. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments
- X. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME GUIDELINES	
PROGRAMME TITLE	LEVEL 5 HIGHER INTERNATIONAL DIPLOMA IN ARTIFICIAL INTELLIGENCE
QUALIFICATION CODE	701/5001/7
LEVEL	LEVEL – 4 & 5
TOTAL CREDITS	240
TOTAL LEARNING HOURS	2400 HOURS
GUIDED LEARNING HOURS	960 HOURS

Total learning hour 2400 Hours

1 Credit = 10 hours of effort (10 hours of learning time which includes everything a learner has to do to achieve the outcomes in a qualification including the assessment procedures and practical's).

Guided Learning Hour for first year is 480 hours and second year is 480 hours.

Total Guided Learning Hours - 960 hours.

HIGHER INTERNATIONAL DIPLOMA IN ARTIFICIAL INTELLIGENCE

COURSE STRUCTURE

YEAR	SEMESTER	UNIT SPECIFICATION	NO. OF. UNITS	UNIT CREDIT	CREDIT/YEAR
I	SEMESTER 1	Essential unit	1	20	120
		Essential unit	1	20	
		Essential unit	1	20	
	SEMESTER 2	Essential unit	1	20	
		Essential unit	1	20	
		Essential unit	1	20	
II	SEMESTER 3	Essential unit	1	20	120
		Essential unit	1	20	
		Essential unit	1	20	
	SEMESTER 4	Essential unit	1	20	
		Essential unit	1	20	
		Essential unit	1	20	
				TOTAL	240

FIRST YEAR	Essential unit carries	20 credit
	Essential unit carries	20 credit
	Essential unit carries	20 credit
SECOND YEAR	Essential unit carries	20 credit
	Essential unit carries	20 credit
	Essential unit carries	30 credit

LIST OF UNITS

S. No.	Subject Code	UNIT	UNIT SPECIFICATION	CREDIT
1	I/750/2021	Foundations of Computational Agents	Essential unit	20
2	I/750/2022	Machine Learning Fundamentals	Essential unit	20
3	I/750/2023	Programming for AI with Python	Essential unit	20
4	I/750/2024	Artificial Intelligence for Healthcare	Essential unit	20
5	I/750/2025	Natural Language Processing	Essential unit	20
6	I/750/2026	Ethics in AI	Essential unit	20
7	I/750/2027	Neural Networks and Deep Learning	Essential unit	20
8	I/750/2028	Computer Vision	Essential unit	20
9	I/750/2029	Artificial Intelligence for Business	Essential unit	20
10	I/750/2030	Artificial Intelligence in Education	Essential unit	20
11	I/750/2031	Responsible AI	Essential unit	20
12	I/750/2032	AI in Entertainment and Gaming	Essential unit	20

Semester : **I**
Year : 1
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
I/750/2021	Foundations of Computational Agents	Essential unit	20
I/750/2022	Machine Learning Fundamentals	Essential unit	20
I/750/2023	Programming for AI with Python	Essential unit	20

Semester : **II**
Year : 1
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
I/750/2024	Artificial Intelligence for Healthcare	Essential unit	20
I/750/2025	Natural Language Processing	Essential unit	20
I/750/2026	Ethics in AI	Essential unit	20

Semester : **III**
Year : 2
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
I/750/2027	Neural Networks and Deep Learning	Essential unit	20
I/750/2028	Computer Vision	Essential unit	20
I/750/2029	Artificial Intelligence for Business	Elective Unit	20

Semester : **IV**
Year : 2
Credit : 60

UNIT CODE	UNIT	UNIT SPECIFICATION	CREDIT
I/750/2030	Artificial Intelligence in Education	Essential unit	20
I/750/2031	Responsible AI	Essential unit	20
I/750/2032	AI in Entertainment and Gaming	Essential unit	20

UNIT CODE : I/750/2021
UNIT TITLE : Foundations of Computational Agents
CREDIT : 20
SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to understand the design of intelligent computational agents and witnessed the emergence of artificial intelligence as a serious science and engineering discipline. It provides a coherent vision of the foundations of the field as it is today. It aims to provide that synthesis as an integrated science, in terms of a multi-dimensional design space that has been partially explored.

The learner can understand the formal theory and a rambunctious experimental wing showing how to link them intimately together. It develops the science of AI together with its various application applications.

UNIT LEARNING OUTCOMES

ULO1 - Understanding of AI Fundamentals

ULO2 - Understand the Proficiency in Knowledge Representation

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2022

UNIT TITLE : Machine Learning Fundamentals

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to o introduce machine learning, and the algorithmic paradigms it offers, in a principled way. This unit provides a theoretical account of the fundamentals underlying machine learning and the mathematical derivations that transform these principles into practical algorithms.

The content helps the learner to understand the computational complexity of learning and the concepts of convexity and stability; important algorithmic paradigms including stochastic gradient descent, neural networks, and structured output learning; and emerging theoretical concepts such as the PAC-Bayes approach and compression-based bounds.

UNIT LEARNING OUTCOME

ULO1 – Understanding of the theoretical foundations of machine learning

ULO2 – Apply the mathematical underpinnings and practical applications.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M			M	M		M	M	M
ULO2			M	M			M	M		

UNIT CODE : I/750/2023

UNIT TITLE : Programming for AI with Python

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to the power of the Python programming language to accelerate your introduction to AI coding. The content provides hands-on introductions to Python and other widely used software tools, as well as expansive discussions of supervised, semi-supervised, and unsupervised machine learning.

Leaner can learn about various Python libraries commonly used in AI development, such as NumPy for numerical computations, pandas for data manipulation, scikit-learn for machine learning algorithms, TensorFlow or PyTorch for deep learning, and NLTK or spaCy for natural language processing.

UNIT LEARNING OUTCOME

ULO1 - Apply Python programming skills to develop AI applications

ULO2 - Optimize and Improve AI Performance

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M	M	M
ULO2	M						M		M	

UNIT CODE : I/750/2024

UNIT TITLE : Artificial Intelligence for Healthcare

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to understand how artificial intelligence can help in healthcare by transforming everything doctors do, from notetaking and medical scans to diagnosis and treatment, greatly cutting down the cost of medicine and reducing human mortality.

Learner can explore the transformative potential of artificial intelligence (AI) in revolutionizing healthcare delivery and improving patient outcomes. The content addresses the potential of AI to reduce healthcare disparities by providing access to high-quality, personalized care for underserved populations, improving health outcomes, and promoting health equity

UNIT LEARNING OUTCOMES

ULO1 - Understanding of AI's Role in Healthcare

ULO2 - Apply the knowledge of AI Applications in Medicine

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2025
UNIT TITLE : Computer Vision
CREDIT : 20
SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to understand computer vision techniques were used in computer graphics to create image-based models of real-world objects, to create visual effects, and to merge real world imagery using computational photography techniques. This unit focus on the applications of computer vision to fun problems such as image stitching and photo-based 3D modelling from personal photos seemed to resonate well.

The learner can build detailed models of the image formation process and develop mathematical techniques to invert these in order to recover the quantities of interest. It create interest on use probabilistic models to quantify the prior likelihood of your unknowns and the noisy measurement processes that produce the input images, then infer the best possible estimates of your desired quantities and analyze their resulting uncertainties.

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UNIT LEARNING OUTCOMES

ULO1 - Foundational Understanding and Algorithm Proficiency

ULO2 - Understand the algorithms and Application of NLP Algorithms

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2026
UNIT TITLE : Ethics in AI
CREDIT : 20
SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to understand intertwining domains of artificial intelligence and ethics. It provides understanding of Ethics in AI system in daily human lives, this volume attempts to address the increasingly complicated relation between humanity and artificial intelligence. It considers not only how humanity must conduct them toward AI but also how AI must behave toward humanity.

This unit's discuss the key ethical principles guiding AI ethics, including beneficence, non-maleficence, autonomy, justice, and fairness. It also provides the importance of transparency and explainability in AI systems, including techniques for making AI systems more transparent and accountable.

UNIT LEARNING OUTCOMES

ULO1- Understanding of Ethical Issues in AI

ULO2- Understand the Social and Ethical Impact Assessment

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2027

UNIT TITLE : Neural Networks and Deep Learning

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims to equip them with a comprehensive understanding of deep learning principles and techniques. Through practical implementation and exploration of advanced topics, learners will gain proficiency in applying deep learning to real-world problems across various domains. Additionally, they will develop skills in optimizing models, understanding theoretical foundations, and evaluating results effectively.

Learners will also be equipped to address ethical considerations and societal implications of deep learning technologies responsibly. By staying updated with advancements and contributing to research and innovation, learners will be prepared to make meaningful contributions to the field of deep learning, driving positive impact in academia, industry, and society

UNIT LEARNING OUTCOMES

ULO1- Understand Deep Learning Fundamentals and Practical Implementation Skills

ULO2- Apply by Optimizing and Fine-Tune Models

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2028
UNIT TITLE : Computer Vision
CREDIT : 20
SPECIFICATION : Essential Unit

UNIT DESCRIPTION

The aim of the course is to provide students with a comprehensive understanding of computer vision principles, algorithms, and applications. Through theoretical concepts, practical implementations, and hands-on projects, students will develop the skills and knowledge necessary to analyze and interpret visual data, extract meaningful information, and build computer vision systems.

UNIT LEARNING OUTCOMES

ULO1- Understanding Computer Vision Fundamentals

ULO2- Applying Computer Vision Techniques in Real-World Applications

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2029

UNIT TITLE : Artificial Intelligence for Business

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to understand "Artificial Intelligence for Business" is to equip them with the knowledge, skills, and mindset necessary to leverage artificial intelligence technologies effectively within business contexts. Through comprehensive learning experiences, learners will develop a deep understanding of AI fundamentals and their applications, enabling them to make informed decisions, drive innovation, and create value in their organizations.

Learner can develop skills in strategic decision-making and business model innovation in the context of AI adoption, including identifying opportunities for AI-driven automation, augmentation, and transformation, and understanding the trade-offs involved in AI investment and implementation.

UNIT LEARNING OUTCOMES

ULO1- Foundational Understanding of Artificial Intelligence (AI) in Business

ULO2- Understand the Integration of AI into Business Strategy

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2030

UNIT TITLE : Artificial Intelligence in Education

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to comprehend the fundamental principles of AI and its intricate applications within educational settings. This unit strive to grasp how AI technologies can revolutionize personalized learning experiences, tailoring education to individual needs. Moreover, learners seek proficiency in utilizing AI-driven tools and platforms to analyse student data, fostering targeted interventions for academic improvement. Ethical considerations surrounding AI's role in education become a focal point, prompting learners to navigate privacy concerns and ethical dilemmas adeptly.

Furthermore, learners aspire to harness AI's potential in streamlining administrative tasks, optimizing operations, and ultimately enhancing educational efficiency. They endeavour to integrate AI-powered resources seamlessly into curriculum design and instruction, fostering innovative and adaptive learning environments.

UNIT LEARNING OUTCOMES

ULO1- Understand the fundamentals of artificial intelligence (AI) and its applications in educational settings

ULO2- Understand the potential impact of AI on the future of education.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

UNIT CODE : I/750/2031
UNIT TITLE : Responsible AI
CREDIT : 20
SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to understand the Responsible AI, the pursuit of ethical and trustworthy development, should be ingrained in every learner objective related to AI. This means understanding potential biases, fairness, explainability, privacy, and security from day one.

This units aims to encourage learner to understand about critical thinking, questioning assumptions, and designing AI systems with human values at the core. By integrating this responsibility into learning goals, we can empower a generation to develop and utilize AI for good, mitigating risks and creating a more equitable future.

UNIT LEARNING OUTCOME

ULO1 - Understand the responsibility of artificial intelligence (AI) to make AI more useful for society and humanity

ULO2 - Understand the principles and practices to perform responsible AI.

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M	M	M			M	M	M	M
ULO2		M				M			M	

UNIT CODE : I/750/2032

UNIT TITLE : AI in Entertainment and Gaming

CREDIT : 20

SPECIFICATION : Essential Unit

UNIT DESCRIPTION

This unit aims the learner to understand the overview of artificial intelligence techniques used in game development and Importance of AI in creating immersive and engaging gaming experiences

This unit introduce the behavioral trees as a method for organizing and executing AI behaviors along with Decision-making processes for non-Player Characters in games. Learners understand to integrate AI seamlessly into the game development process, collaborating with game designers, programmers, and artists to implement AI-driven features and mechanics effectively.

UNIT LEARNING OUTCOMES

ULO1- Understanding of Game AI Techniques and Practical Application

ULO2- Understand the ethical considerations and implications of AI in gaming

MAPPING

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10
ULO1	M	M		M	M		M	M		M
ULO2	M			M		M		M		

ASSESSMENT METHODS AND TECHNIQUES

Assessment technique	Type of Assessment	Description	Formative or Summative
Case studies	Oral/ Problem based/ Practical	Students are required to work through a case study to identify the problem(s) and to offer potential solutions; useful for assessing students' understanding and for encouraging students to see links between theory and practice. Case studies could be provided in advance of a time-constrained assessment.	Formative
Concept maps	Written/ Oral	Students map out their understanding of a particular concept. This is a useful (and potentially quick) exercise to provide feedback to staff on students' understanding.	Formative
'Doing it' exam	Written	An exam which requires students to do something, like read an article, analyze and interpret data etc.	Formative / Summative
Field report	Written/ Oral	Students are required to produce a written/ oral report relating to a field/ site visit.	Formative
Laboratory books / Reports	Practical/ Written	Students are required to write a report for all (or a designated sample) of practical's in a single lab book. A sample of lab books will be collected each week to mark any reports of labs done in previous weeks; this encourages students to keep their lab books up to date. Each student should be sampled the same number of times throughout the module with a designated number contributing to the assessment mark.	Summative
Multiple choice questions (MCQs)	Written	Can be useful for diagnostic, formative assessment, in addition to summative assessment. Well-designed questions can assess more than factual recall of information, but do take time to design.	Formative / Summative
Online discussion boards	Written	Students are assessed on the basis of their contributions to an online discussion for example, with their peers; this could be hosted on a virtual learning environment (VLE).	Formative
Open book exams	Written	Students have the opportunity to use any or specified resources to help them answer set questions under time constraints. This method removes the over-reliance on memory and recall and models the way that professionals manage information.	Summative
Oral presentations	Oral / Written	Students are asked to give an oral presentation on a particular topic for a specified length of time and could also be asked to prepare associated	Summative

		handout(s). Can usefully be combined with self- and peer-assessment.	
Problem sheets	Written	Students complete problem sheets, e.g. on a weekly basis. This can be a useful way of providing students with regular formative feedback on their work and/or involving elements of self- and peer assessment.	Formative
Research projects / Group projects	Written/ Practical/ Oral/ Performance/ Problem based/ Work placement	Potential for sampling wide range of practical, analytical and interpretative skills. Can assess wide application of knowledge, understanding and skills.	Formative / Summative
Short answer questions	Written	Useful to assess a wide range of knowledge/skills across a module.	Summative
Simulations	Practical/ Written/ Oral/ Problem-based	Text or virtual computer-based simulations are provided for students, who are then required to answer questions, resolve problems, perform tasks and take actions etc. according to changing circumstances within the simulation. Useful for assessing a wide range of skills, knowledge and competencies.	Formative
Viva voce	Oral	Often used for assessing 'borderline' degree classifications but also useful to explore students' understanding of a wide range of topics. Depending on class size however, they can be time consuming for staff.	Summative