Lyceum of the Philippines University Cavite
College of Engineering, Computer Studies & Architecture

SYLLABUS IN INFORMATION TECHNOLOGY

COURSE INFORMATION	
Course Title	CS ELECTIVE 3 (ARTIFICIAL INTELLIGENCE)
Course Code	CSELC03C
No. of Units	3
Lecture Hours/Week	One (2) hour
Laboratory	Three (3) hours
Hours/Week	Five (5) hours
Pre-requisite/s	N/A
Co-requisite/s	N/A

Course Description:

The course introduces students to the field of Artificial Intelligence (AI) with emphasis on its use to solve real world problems for which solutions are difficult to express using the traditional algorithmic approach. It explores the essential theory behind methodologies for developing systems that demonstrate intelligent behavior including dealing with uncertainty, learning from experience and following problem solving strategies found in nature

Course Outcomes (COs)

At the end of the course, the student should be able to;

1. Understand the basic artificial intelligence concepts
2. Choose and use appropriate programming language for artificial intelligence
3. Identify problems where artificial intelligence techniques are applicable
4. Apply selected AI techniques based on the intended application

VISION

An internationally-accredited University dedicated to innovation and excellence in the service of God and Country.

MISSION

Lyceum of the Philippines University, espousing the ideals of Jose P. Laurel, is committed to the following missions:

1. Advance and preserve knowledge by undertaking research and disseminating and utilizing the results. – **RESEARCH**
2. Provide equitable access to learning through relevant, innovative, industry-based and environment-conscious programs and services in the context of nationalism and internationalism. – **INSTRUCTION and QUALITY SERVICES**
3. Provide necessary knowledge and skills to meet entrepreneurial development and the managerial requirements of the industry. – **INSTRUCTION**
4. Establish local and international linkages that will be the source of learning and growth of the members of academic community. – **INSTRUCTION AND INSTITUTIONAL DEVELOPMENT**
5. Support a sustainable community extension program and be a catalyst for social transformation and custodian of Filipino culture and heritage. – **COMMUNITY EXTENSION**
6. Build a community of God-centered, nationalistic, environment conscious, and globally competitive professionals with wholesome values and attitudes. – **PROFESSIONALISM and VALUES**

LPU CORE VALUES

L - Love of God		J - Justice
P - Professional Integrity	N – Nationalism	P – Perseverance
U – Unity		L – Leadership

EDUCATIONAL POLICY

Lyceum of the Philippines University Cavite is committed to forming WORLD CLASS PROFESSIONALS, LIFELONG LEARNERS and INTEGRAL LEADERS by providing quality research, instruction, community extension and support services, and achieving institutional development through innovative and excellent educational organization management system.

EDUCATIONAL OBJECTIVES

In implementing the educational policy, Lyceum of the Philippines University Cavite shall:

1.Proactively FOCUS ON LEARNERS AND OTHER BENEFICIARIES through engagement of *interpersonal skills* and work productivity in multidisciplinary, multicultural, and diverse teams.

2. Develop learners' VISIONARY LEADERSHIP to become *innovative leaders* with an inquisitive mind in looking for opportunities to reflect and apply new knowledge and skills in a positive sustainable way through research and project studies.

3. Enact ENGAGEMENT OF PEOPLE in educational processes through planning and implementation.

4. Employ PROCESS APPROACH to embody *lifelong learning* strategies, leadership characteristics, and practical skills for one's life and survival.

5. Facilitate CONTINUAL IMPROVEMENT of quality education through a responsive and relevant feedback mechanism through local and international quality assurance programs.

6. Show good decision-making skills through *critical thinking* by weighing situations clearly and scrutinizing concerns and challenges with a rational and EVIDENCE-BASED DECISIONS AND APPROACH.

7. Foster RELATIONSHIP MANAGEMENT with university stakeholders.

8. Implement SOCIAL RESPONSIBILITY through the demonstration and application of *values-driven* principles, ethical decision-making and sustainability.

9. Provide educational ACCESSIBILITY AND EQUITY through various programs and activities.

10. Carry out ETHICAL CONDUCT in educational programs and learning processes.

11. Implement DATA SECURITY AND PROTECTION mechanisms through strict adherence with government and other regulatory bodies' policies, standards and guidelines.

LYCEAN GRADUATE ATTRIBUTES (LYGA)	EDUCATION LEARNING OUTCOMES (ELO) – FORMER INSTITUTIONAL INTENDED LEARNING OUTCOMES (IILO'S)
COLLABORATIVE LEADERS	• Proactively employ interpersonal skills and work productively in multidisciplinary, multicultural, and diverse teams. • Manifest a bigger emerging patterns that makes the most of their significance. • Express ideas clearly and effectively in oral and written communication. • Demonstrate proficiency in the use of English language in both oral and written communication.
LIFELONG LEARNERS	• Perform discipline-based knowledge and skills to look for opportunities for continuous learning and development. • Embody lifelong learning strategies, leadership characteristics, and practical skills for one's life and survival. • Sharpen competencies to aid the demand and needs of the society for economic and social development. • Demonstrate adherence to the ideals of Jose P. Laurel in the continuous advocacy of *Veritas et Fortitudo, Pro Deo et Patria*.
CRITICAL THINKERS	• Show good decision-making skills by weighing situations clearly and scrutinizing concerns and challenges with a rational, ethical, and evidence-based approach. • Solve potential problems and pursue opportunities in an efficient and effective manner. • Advocate factual information acquisition and dissemination. • Apply decision making strategies to critically and creatively solve problems and drive positive results.
VALUES-DRIVEN LEADERS	• Embody integrity, professionalism, and ethical responsibility. • Manifest leadership abilities with positive values and attitude to promote peace and goodwill. • Lead and support others by inspiring them with a clear vision and motivating them to achieve goals through entrepreneurial ventures. • Demonstrate an apply the principles of ethical decision-making, social responsibility, and sustainability.
INNOVATIVE LEADERS	• Exhibit an inquisitive mind in looking for opportunities to reflect and apply new knowledge and skills in a positive sustainable way. • Demonstrate the ability to define, address, and create significant positive change in a pro-active and sustainable manner. • Demonstrate knowledge and skills related to computer and information technology and utilize the same to process information and manage data observing legal and ethical concerns. • Participate in the generation of new knowledge through research and project studies.

COLLEGE VISION

The College of Engineering, Computer Studies and Architecture envisions itself as among the top team players in the field of Architecture, Engineering and Information Communication Technology (ICT) educational institutions that produce quality centered graduates who imbibe the fundamental core values of LPU and seek the truth and fortitude in the service of God and Country.

COLLEGE MISSION

The College of Engineering, Computer Studies and Architecture through the ideals of President Jose P. Laurel is committed to its mission:

As an institution inspired by the philosophy "Veritas et Fortitudo", we conscientiously seek to provide students with a body of language that will enable them to apply the knowledge and skills in the fields of Engineering and ICT;

As a learning institution, we support the development and well-being of a competent, responsible and God-fearing individual through innovative, scientific, social, cultural and industry-based programs.

As a member of a conscientious community, we support programs that will lead to the development of community awareness through student participation in various activities that will highlight the social impact of Engineering and ICT in the business environment.

PROGRAM EDUCATIONAL OBJECTIVES

1. COMPETENT - Equipped with advanced skills that will allow them to be immediately competitive in the local or international industries while providing the best opportunity for achieving their full potential;
2. OUTSTANDING - Demonstrated life-long learning via progress toward completion of an advanced degree, professional development/continuing education courses, or industrial training courses;
3. ESTABLISHED - Demonstrated professional success via promotions and/or positions in top companies, academic institutions or starting up their own enterprise increasing professional responsibility;
4. CONFIDENT- Initiated and implemented actions while exhibiting high standard of professional behaviors and attitude toward the improvement of engineering, architectural and ICT practice;
5. SOCIALLY RESPONSIVE - Active participation in accredited professional organizations as well as community-based organization with the purpose of being the transformers of the industry towards innovation;
6. ACHIEVER - Engaged and succeeded in their professional careers through projects that show ability to solve complex engineering, architectural and technical problems.

COURSE ALIGNMENT MATRIX

LYGA	STUDENT OUTCOMES	COURSE OUTCOMES
COLLABORATIVE LEADERS	e. Individual and Teamwork	Explain the fundamental principles of OOP, including encapsulation, inheritance, abstraction, and polymorphism.
LIFELONG LEARNERS	c. Design/Development of Solutions d. Modern Tools Usage f. Life-Long Learning	Implement error handling and exception classes to write robust and reliable code. Read and write data from/to files and understand data serialization techniques and read and write data from/to files and understand data serialization techniques.
CRITICAL THINKERS	a. Apply Knowledge for Solving Computing Problems b. Problem Analysis	Create and use classes and objects in Python to model real-world entities, apply inheritance and polymorphism to build complex class hierarchies and achieve code reuse, and design classes that abstract complex behavior and encapsulate data effectively.
VALUES-DRIVEN LEADERS	g. Computing Professionalism and Social Responsibility	Apply all learned concepts to design and implement a substantial project that uses the object-oriented programming paradigm.

COURSE CONTENT

PRELIM					
Lesson 1: Introduction to Artificial Intelligence					
Week	Hours	Lesson Learning Outcomes (LLO) (Knowledge, Skills, Values)	Topic	Suggested Teaching/Learning Activities (TLAs)	Assessment Tasks (ATs)
1	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Discuss all the necessary requirements such as attendance, written quizzes, hands-on exams, major exams final projects, and compliance with standard policies.	Course Orientation	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations.	Recitation
	3	**Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Enumerate and discuss the laboratory rules and guidelines. • Demonstrate how to submit and transfer files using mRooms.	Laboratory Orientation Computer Laboratory Rules and Guidelines Use of PyCharm	Lecture / Discussion Demonstration	Laboratory Activity: Simple Calculator using Python.

2	2 3	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Identify the origin of artificial intelligence; • Recognize the importance of artificial intelligence • Understand its concept and relation to human **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Set up a Python environment with PyCharm. • Create and run simple Python programs.	Introduction to Artificial Intelligence Python and PyCharm Use of Python Program Packages	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion Lecture / Discussion Demonstration	Recitation Quiz Seatwork Group Exercises Laboratory Activity
3	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Determine the structure of intelligent agent	Research Areas	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming	Recitation Quiz Seatwork Group Exercises

	3	• Understand the agent's behavior and environment • Design principles for building a successful agent **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Use Python's program packages to read and write data to CSV	Creating and Reading CSV files	Collaborative Class Discussion Lecture / Discussion Demonstration	Laboratory Activity
4-5	2 3	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Understand how searching is used as a universal problem-solving technique in AI	Search Algorithms	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion Lecture / Discussion	Recitation Quiz Seatwork Group Exercises Laboratory Activity

		Laboratory ***LLO 2***. At the end of the session, the students should be able to: • Use Python's program packages to read data from a CSV file • Use Python's program packages to search for a specific data	Searching and Sorting in Python	Demonstration	
PRELIM EXAMINATION					
Lesson 2: AI Utilization on Systems					
Week	Hours	Lesson Learning Outcomes (LLO) (Knowledge, Skills, Values)	Topic	Suggested Teaching/Learning Activities (TLAs)	Assessment Tasks (ATs)
LESSON 3: Encapsulation and Abstraction					
7-8	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • After the completion of the chapter, students should • be able to: • Analyze the process of fuzzy systems	Fuzzy Logic Systems	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion	Recitation Quiz Seatwork Group Exercises

	3	• Familiarize the fuzzy systems • Understand how defuzzification works **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Apply Fuzzy Logic on a predefined dataset to create a crisp output • Apply defuzzification on fuzzy inputs	Simulation: Air Conditioner	Lecture / Discussion Demonstration	Laboratory Activity
9-10	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Understand how a AI/robotic system can understand and perform commands	Natural Language Processing	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion	Recitation Quiz Seatwork Group Exercises

	3	**Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Design an NLP model that uses LSTM • Use an existing dataset to train and test said model	LSTM Model for Spotify App Reviews	Lecture / Discussion Demonstration	Laboratory Activity
11	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Familiarize with the ways to create an expert system **Laboratory** ***LLO 2***. At the end of the session, the students should be able to:	Expert Systems	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion	Recitation Quiz Seatwork Group Exercises
	3	• Apply Creational Design Pattern in Class and Object instantiation. • Defne the use of the creational design pattern in coding using Python	Philippine Laws / Human Rights Expert System	Lecture / Discussion Demonstration	Laboratory Activity

MIDTERM EXAMINATION					
LESSON 3: Modern and Advanced AI Concepts					
13-14	2 3	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Understand the difference of AI Programs and Robots • Familiarize with the components of robotics used in other forms **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Analyze the practical uses of robotics in the industry	Robotics Case Study: Robotics in the Modern World.	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion Lecture / Discussion Demonstration	Recitation Quiz Seatwork Group Exercises Laboratory Activity
15-16	2	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Understand how AI replicates the human mind via Neural Networks	Neural Networks	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming	Recitation Quiz Seatwork Group Exercises

	3	• Understand the basic structure of neural networks **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Apply neural networks on LMs • Understand how LLMs work	Neural Networks on Language Models	Collaborative Class Discussion Lecture / Discussion Demonstration	Laboratory Activity
17-18	2 3	**Lecture** ***LLO 1***. At the end of the session, the students should be able to: • Understand how LMs understand commands through prompts • Apply ways to fine-tune a prompt to produce better results **Laboratory** ***LLO 2***. At the end of the session, the students should be able to: • Test the capabilities of ChatGPT to produce different results on prompts	Prompt Engineering ChatGPT Prompt Tuning	Lecture / Discussion Students analyze the concept explained by the teacher through PowerPoint presentations and modules. Brainstorming Collaborative Class Discussion Lecture / Discussion Demonstration	Recitation Quiz Seatwork Group Exercises Laboratory Activity

FINAL EXAMINATION

TEXTBOOK:

- Chakrabarti, S., Panja, A., Mukherjee, A., Bar, A. (2019). Intelligent Electrical Systems: A Step towards Smarter Earth. CRC Press.
- Lawless, W., Mittu, R., Sofge, D., Shortell, T., McDermott, T. (2021). Systems Engineering and Artificial Intelligence. Springer.
- Gupta, I., Nagpal, G. (2020). Artificial Intelligence and Expert Systems. Mercury Learning and Information, LLC.
- Venkatesh, C., Rengarajan, N., Ponmurugan, P., Balamurugan, S. (2022). Smart Systems for Industrial Applications. Scrivener Publishing LLC.
- Moallem, A. (2022). Smart and Intelligent Systems: The Human Elements in Artificial Intelligence, Robotics, and Cybersecurity. CRC Press

COURSE REQUIREMENTS:

1. Programs and/or Seatwork (must be submitted on the deadline set by the instructor).
2. Research work related to the course (preferably related to the program took by the student).
3. Assignments (must be submitted on the deadline set by the instructor).
4. Attendance (Absents should not exceed to the maximum allowable number of hours required for this subject. Refer to Student Handbook)
5. Quizzes
6. Laboratory Activity / Experiments (if applicable in the course)
7. Examinations
    a. Preliminary Examination
    b. Midterm Examination
    c. Final Examination
8. Recitation, participation, board works.
9. Final Project / Case Study

GRADING SYSTEM:

Prelim Period Grade (G1)	Prelim Exam (PE)	40%	100%
	Creative Academic Performance (CAP) 1	60%	
Midterm Period Grade (G2)	Midterm Exam (ME)	40%	100%
	Creative Academic Performance (CAP) 2	60%	
Final Period Grade (G3)	Final Exam (FE)	40%	100%
	Creative Academic Performance (CAP) 3	60%	

FINAL GRADE = Prelim-Term Grade x 33.33 + Midterm Grade x 33.33 + Final Grade x 33.34

COURSE POLICIES:

Write the policies applicable to the course (e.g)

1. **All major exams, particularly Prelim, Midterm and Final Examinations shall be administered as scheduled (based on the University Calendar).**
2. **If you miss a major examination or any class activity, your absence may be excused and you shall be allowed to make up for it only when your reasons are acceptable as assessed by your instructor.**

3. **Any form of cheating and dishonesty shall not be tolerated. Once you are found guilty of such, your chance to earn points or grades for the specific outputs shall be automatically forfeited.**

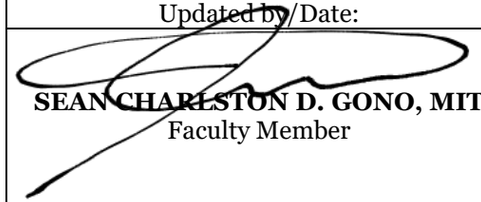
CONSULTATION SCHEDULE:

Faculty Member: Sean Charlston D. Gono, MIT

Email-address: sean.gono@lpu.edu.ph

Consultation Hours: 9:00 – 10:30 AM

Time and Venue: Monday / COECSA Faculty Room

Prepared and Updated by/Date:	Reviewed by/Date:	Validated by/Date:	Approved by/ Date
 **SEAN CHARLSTON D. GONO, MIT** Faculty Member	Program Chairperson	Industry Advisory Board Member	College Dean

APPENDIX

ACRONYMS AND MEANINGS

LYGA - *Lycean Graduate Attributes*
The comprehensive set of qualities and abilities that Lycean education cultivates in its students. These intellectual, personal, and social qualities enable graduates to thrive in a world that is swiftly changing and interconnected.

ELO – *Education Learning Outcomes*
The knowledge, skills, attitudes, and values that students are expected to acquire and demonstrate upon completion of an educational program guided by the AUN framework.

PEO – *Program Educational Objectives*
Statements describing the expected accomplishments and professional achievements of academic program graduates.

PLO – *Program Learning Outcomes*
Statements that provide a clear and quantifiable structure for assessing students' accomplishments and serve as guidelines for curriculum development and program evaluation.

CILO – *Course Intended Learning Outcomes*
Specific statements that describe the knowledge, skills, and competencies that students are expected to acquire or demonstrate by the end of a course.

LLO – *Lesson Learning Outcomes*
Specific and measurable statements characterizing the knowledge, skills, and attitudes that students are expected to acquire by the end of a lesson.

TLA – *Teaching/ Learning Activity*
Purposeful and structured educational process that involves the transfer of knowledge, skills, and attitudes from educators (teachers, instructors, facilitators) to learners (students, participants)

AT – *Assessment Task*
Activity or assignment designed to evaluate and assess a student's knowledge, skills, and competencies in a specific subject or area of study.