NATIONAL UNIVERSITY OF SAN MARCOS
(The University of Peru, DEAN OF AMERICA)
FACULTY OF SYSTEMS ENGINEERING AND COMPUTER SCIENCE
SCHOOL OF SOFTWARE ENGINEERING

SYLLABUS

1. GENERAL INFORMATION

1.1 Course Name	:	Intelligent Software – Plan 2018
1.2 Course Code	:	202W0908
1.3 Course Type	:	Mandatory
1.4 Area of Study	:	Specific
1.5 Number of Weeks	:	16
1.6 Weekly Hours	:	Theory: 2, Practice: 0, Lab: 2
1.7 Academic Semester	:	2025-1
1.8 Cycle	:	IX
1.9 Credits	:	3
1.10 Modality	:	In person
1.11 Prerequisites	:	—
1.12 Teacher(s)	:	—

2. COURSE SUMMARY

This course falls under the complementary studies area and is theoretical and practical in nature. Its purpose is to develop intelligent systems based on knowledge of artificial intelligence and algorithms developed in data mining: "Build, develop, and manage software solutions for managerial decision-making using international quality and data science methodologies and standards with an ethical attitude and social responsibility." The main content is: Data collection and exploration using algorithms. Use of statistical techniques for data analysis with algorithms. Machine learning algorithms, deep learning algorithms, Common KADS algorithms, and genetic algorithms.

3. GRADUATE PROFILE COMPETENCIES CONTRIBUTED BY THIS COURSE

Code	Description	Type	Level
CG3.3	Apply the capacity for analysis and critical thinking in the development of activities related to your future professional life	Generic	Avanzado
CT11.3	Implement intelligent software based on emerging development processes with an ethical, critical, and innovative attitude.	Specialty	Avanzado
CE12.3	Implements software solutions for management decision-making using international quality and data science methodologies and standards with an ethical attitude and social responsibility.	Specialty	Avanzado
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4. LEARNING ACHIEVEMENTS

CG3.3
Analyze and relate algorithms as models of human life, whose application solves real-life problems.

CT11.3
Develop and implement intelligent software using artificial intelligence methods, techniques, and methodologies in multidisciplinary teams with an ethical, critical, and innovative attitude.

CE12.3
Develops and implements intelligent software solutions for managerial decision-making, using international quality and data science methodologies and standards with an ethical attitude and social responsibility.

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5. CAPACITIES

- **Unit 1:** Introduction to bio-inspired software and algorithms

  Description: He is familiar with genetic algorithms and has the ability to implement solutions tailored to the needs of the environment.

- **Unit 2:** Neural Networks

  Description: It has the ability to design neural network architectures tailored to the requirements of organizations and/or the environment.

- **Unit 3:** Image processing

  Description: You are familiar with image classification models and algorithms and can implement intelligent software with an artificial intelligence engine based on image processing.

- **Unit 4:** Natural Language Processing

  Description: He is familiar with natural language processing models and can implement solutions tailored to the environment's requirements.

6. CONTENT PROGRAMMING

Unit 1: Introduction to bio-inspired software and algorithms

Unit Achievement: Understands and models solutions using genetic algorithms, and designs intelligent software based on bio-inspired algorithms.

Sem	Content	Activities	Resources	Strategies
1	• Fundamentals of intelligent software development, MLops Common KADS Methodology.	• Entrance assessment • Syllabus sharing • Group formation for the course project • Presentation and discussion of content • Laboratory tool recognition	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
2	• Fundamentals of Multi-Agent Systems • Types of agents and environments • Agent architecture	• Presentation and discussion of content • Presentation of cases that require multi-agent systems • Multi-agent systems laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
3	• Bioinspired algorithms: genetic, swarm	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of bio-inspired algorithms	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming	• Active learning • Case analysis • Teamwork

Sem	Content	Activities	Resources	Strategies
		• Genetic algorithms laboratory	language Python	
4	• Data collection and exploration using algorithms	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require data collection • Data collection laboratory using algorithms	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork

Unit 2: Neural Networks

Unit Achievement: dasdasdas

Sem	Content	Activities	Resources	Strategies
5	• Use of statistical techniques for inference, Machine Learning in intelligent software	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of machine learning • Laboratory of statistical techniques in machine learning	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
6	• Multilayer Neural Networks	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of multilayer neural networks • MLP laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
7	• Recurrent Neural Networks, LSTM	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of recurrent neural network algorithms • LSTM network laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
8	Partial exam	—	—	—

Unit 3: Image processing

Unit Achievement: casdasdadas

Sem	Content	Activities	Resources	Strategies
9	• Deep learning	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of deep learning • Deep learning architecture laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
10	• CNN	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require image classification • Image classification laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
11	• Image classification	• Assessment of prior knowledge • Presentation and discussion of	• PowerPoint presentation on the	• Active learning • Case analysis •

Sem	Content	Activities	Resources	Strategies
		content • Presentation of cases that require image classification • Image classification laboratory	topic • Texts and books • Dataset • Programming language Python	Teamwork
12	• Advanced algorithms in image classification	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require the use of advanced algorithms in image classification • Image classification laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork

Unit 4: Natural Language Processing

Unit Achievement: gdfgdf

Sem	Content	Activities	Resources	Strategies
13	• Transfer learning, pre-trained models	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require transfer learning • Laboratory of pre-trained models	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
14	• Natural language processing	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require natural language processing techniques • NLP Lab	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
15	• Language models: GPT Chat, Generative AI	• Assessment of prior knowledge • Presentation and discussion of content • Presentation of cases that require generative artificial intelligence • Language models laboratory	• PowerPoint presentation on the topic • Texts and books • Dataset • Programming language Python	• Active learning • Case analysis • Teamwork
16	Final exam	—	—	—

7. TEACHING STRATEGY

The instructor promotes active student participation during the theoretical and laboratory sessions, applying problem-based learning, case methods, and project-based learning, as well as teamwork and collaborative groups. To this end, the instructor will publish the course materials, the problems and cases to be developed, and the basic team project guide in the Virtual Classroom.

8. LEARNING ASSESSMENT

EVALUATION The following instruments are considered: ▪ Partial Exam (PE) ▪ Final Exam (FE) ▪ Partial Work Report 1 (TP) ▪ Final Work Report 2 (TF) GPA calculation: N1 = PE*0.30 N2 = Average (TP, TF)*0.40 N3 = EF*0.30

Formula: PF = (N1 + N2 + N3)

- NO SUBSTITUTE EXAM WILL BE GIVEN.

Unit	Criterion	Performance	Product	Instrument
Introduction to bio-inspired software and algorithms	Understanding Bioinspired Algorithms	Foundation and knowledge of bioinspired algorithms	Deliverable Report (PE1)	Rubric Checklist
Neural Networks	Understanding Neural Networks	Understand and understand neural networks	Deliverable report Report (PE12 Midterm exam)	Rubric Checklist
Image processing	Understanding the fundamentals of image processing	Understand and understand image processing techniques	Deliverable report Report (PE12 Midterm exam)	Rubric Checklist
Natural Language Processing	Understanding and Foundation of NLP	Understand and understand NLP techniques	Deliverable report Report (PE12 Midterm exam)	Rubric Checklist

9. BIBLIOGRAPHY

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- Simmon, R., & Mark, G. (2012). A First Course in Machine Learning (1st Edition). Taylor & Francis Group.
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- The Data Warehouse Toolkit (3rd Edition), Ralph Kimball, MARGY ROSS, Wiley Computer Publishing, 2013