NCEAC.FORM.001-D

**COURSE DESCRIPTION: AL2001 Programming for Artificial Intelligence - Lab**

**COURSE DESCRIPTION FORM**

**INSTITUTION** FAST School of Computing, National University of Computer and Emerging Sciences, Chiniot-Faisalabad Campus

**PROGRAM TO BE EVALUATED**

**BS-AI FALL 2024**

**Course Description**

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| **Course Code** | AL2001 | | | | |
| **Course Title** | Programming for Artificial Intelligence - Lab | | | | |
| **Credit Hours** | 1 (3+1) | | | | |
| **Prerequisites by Course(s) and Topics** | Programming Fundamentals | | | | |
| **Grading Policy** | Absolute Grading | | | | |
| **Policy about missed assessment items in the course** | Retake of missed assessment items (other than midterm/ final exam) will not be held.  For a missed midterm/ final exam, an exam re-take/ pre-take application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee will decide the exam re-take/ pre-take cases. | | | | |
| **Course Plagiarism Policy** | Plagiarism in project or midterm/ final exam may result in F grade in the lab. Plagiarism in lab tasks will result in zero marks in the **whole lab** category. | | | | |
| **Assessment Instruments with Weights** (homework, quizzes, midterms, final, programming assignments, lab work, etc.) | ***100% Practical***  Assessment Items | | | | |
|  | **Assessment Item** | **Number** | **Weight (%)** |  |
| Lab Tasks | 15 | 40 |
| Project | 1 | 15 |
| Class Participation | 1 | 05 |
| Final Exam | 1 | 40 |
| **Lab Instructor** | Ms, Isma Waheed | | | | |
| **Lab Coordinator** | Ms. Isma Waheed | | | | |
| **URL (if any)** | <http://slate.nu.edu.pk> | | | | |

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| **Current Catalog Description** | Explore the intersection of programming and artificial intelligence in this dynamic lab course. Students will delve into fundamental concepts and practical applications of programming languages tailored for AI development. Through hands-on projects and experimentation, students will gain proficiency in languages such as Python, NumPy, Pandas, Matplotlib, Data Scrapping etc. |
| **Textbook (or Laboratory Manual for Laboratory Courses)** | * Python for everybody * Python basics by Quintinites * A practical introduction to python 3 by David Amos, Dan Bader, Joanna Jablonski, Fletcher Heisler |
| **Reference Material** | * Python tutorial codes by Mustafa GERMEC |

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| **Course Learning Outcomes** |  | **A. Course Learning Outcomes (CLOs)** | | | | | | | | |  |
| On successful completion of this course students will have to know how of: | | | | | | | |  |
| **CLO** | **Course Learning Outcome (CLO)** | | **Domain** | **Taxonomy level** | **GAs** | **Tools** | |
| 1 | Comprehend the fundamental constructs of programming language for Artificial Intelligence | | Cognitive |  | 02, 03, 04 | Lab, F, Project | |
| 2 | Understand and apply the Object-oriented concepts in the programming language | | Cognitive |  | 02,03, 04 | Lab, F, Project | |
| 3 | Solve and analyze programming and data analysis problems using standard libraries and/or toolboxes of the programming language. | | Cognitive |  | 02,03, 04, 05 | Lab, F, Project | |
| **B. Graduate Attributes** | | | | | | | |
| For each attribute below, indicate whether this attribute is covered in this course or not. Leave the cell blank if the enablement is little or non- existent. | | | | | | | |
| GA-1.  Academic Education | | To prepare graduates as computing professionals | | | | |  |
| GA-2.  Knowledge for Solving Computing Problems | | Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing  models from defined problems and requirements | | | | | ✔ |
| GA-3.  Problem Analysis | | Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and  relevant domain disciplines | | | | | ✔ |
| GA-4  Design/ Development of Solutions | | Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and  environmental considerations | | | | | ✔ |
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|  |  |  | GA-5. Modern Tool Usage | |  | Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations. | | | | | | | | ✔ |  |  |
| GA-6.  Individual and Team Work | |  | Function effectively as an individual and as a member or leader in diverse teams and in multi- disciplinary settings. | | | | | | | |
| GA-7.  Communication | |  | Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and  understand clear instructions | | | | | | | |
| GA-8. Computing Professionalism and Society | | | Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to  professional computing practice | | | | | | | |  |
| GA-9.  Ethics | |  | Understand and commit to professional ethics, responsibilities, and norms of professional  computing practice | | | | | | | |  |
| GA-10.  Life-long Learning | | | Demonstrate knowledge and understanding of management principles and economic decision  making and apply these to one’s own work as a member or a team. | | | | | | | |  |
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|  | **C. Mapping of CLOs on Gas**  (CLO: Course Learning Outcome, Gas | | | | | | | | | | | | |
|  | | Gas | | | | | | | | | | |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | |
| **CLOs** | 1 |  | ✔ | ✔ | ✔ |  |  |  |  |  |  | |
| 2 |  | ✔ | ✔ | ✔ |  |  |  |  |  |  | |
| 3 |  | ✔ | ✔ | ✔ | ✔ |  |  |  |  |  | |
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|  | **Tentative Lectures Plan** | | | | |
| **Weeks** | | **Contents/Topics** | | **Clo’s** | **Assessment Tool** |
| ***Week-01*** | | Introduction and Installation | | 1 | Lab |
| ***Week-02*** | | Basics of Python, Variables, Data Types, Conditional Structure, Iterative Structure | | 1 | Lab |
| ***Week-03*** | | Strings, Functions | | 1 | Lab |
| ***Week-04*** | | List, Dictionary, Tuple | | 1 | Lab |
| ***Week-05*** | | File Handling | | 1 | Lab |
| ***Week-06*** | |  | **Mid Term Exam** | | |
| ***Week-07*** | | Regular expression | | 1 | Lab |
| ***Week-08*** | | Introduction to OOP | | 2 | Lab |
| ***Week-09*** | | Operator Overloading | | 2,3 | Lab |
| ***Week-10*** | | NumPy Arrays | | 1,2 | Lab |
| ***Week-11*** | | Pandas | | 3 | Lab |
| ***Week-12*** | | Combination of NumPy and Pandas | | 3 | Lab |

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| ***Week 13*** | Matplotlib | | 3 | Lab |
| ***Week 14*** | Data Scraping | | 2,3 | Lab |
| ***Week-15*** | Folium | | 2,3 | Lab |
| ***Week-16*** | Basics of Machine Learning | | 2,3 | Lab |
| ***Week-17*** |  | **Final Exam** | | |



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| **Laboratory Projects/Experime nts Done in the Course** | According to student proposal (Student’s Choice) | | | |  |
| **Programmig Assignments Done in the Course** | . | | | |
| **Class Time Spent**  (in percentage) | **Theory** | **Problem Analysis** | **Solution Design** | **Social and Ethical Issues** |
| 50 | 5% | 50% | 40% | 5% | |
| **Oral and Written Communications** | Every student is required to submit at least \_1\_ written reports of typically \_5 to 10\_ pages and to make \_1\_ oral presentations of typically \_10\_ minute’s duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy. | | | | |



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**Instructor Name: Isma Waheed**

**Instructor Signature: Date:**