**خطة المساق الدراسي**

**COURSE PLAN**

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| **أولًا: تعريف المساق FIRST: COURSE IDENTIFICATION** | | | | | | | | | | | | | | | | | | | |
| **الكلية والقسم College & Department** | | | | | | | | | | | | | | | | | | | |
| الكلية | | | | تكنولوجيا المعلومات | | | | | Information Technology | | | | | | College | | | | |
| القسم | | | | علم البيانات والذكاء الاصطناعي | | | | | Data Science and Artificial Intelligence | | | | | | Department | | | | |
| السنة الدراسية | | | | 2024/2025 | | | | | 2024/2025 | | | | | | Year | | | | |
| الفصل الدراسي | | | | الأول | | | | | 1st Semesmter | | | | | | Semester | | | | |
| **تفاصيل المساق Course Details** | | | | | | | | | | | | | | | | | | | |
| اسم المساق | | | | التعلم الآلي | | | | | Machine Learning | | | | | | Course Title | | | | |
| رمز المساق | | | | 075045000 | | | | | 075045000 | | | | | | Course Code | | | | |
| نوع المساق | | | | محاضرة | | | | | Lecture | | | | | | Course Type | | | | |
| الساعات المعتمدة | | | | 3 | | | | | 3 | | | | | | Credit Hours | | | | |
| المتطلب السابق | | | | 074127300 | | | | | 074127300 | | | | | | Pre-request | | | | |
| آلية تدريس المساق | | | | وجاهي الكتروني مدمج | | | | | | | | | | | | | | | |
| Face-to-Face Online Blended | | | | | | | | | | | | | | | Teaching Method | | | | |
| **معلومات المدرس Instructor Contact Information** | | | | | | | | | | | | | | | | | | | |
| **اسم المدرس** | | | | فادي محمد سلامة السحيمات | | | | | Fadi M. S. Alsuhimat | | | | | | **Instructor Name** | | | | |
| **رقم المكتب** | | | |  | | | | |  | | | | | | **Office No.** | | | | |
| **الرقم الداخلي** | | | | 2456 | | | | | 2456 | | | | | | **Tel (Ext)** | | | | |
| **البريد الالكتروني** | | | | fshimat@philadelphia.edu.jo | | | | | fshimat@philadelphia.edu.jo | | | | | | **E-mail** | | | | |
| **الساعات المكتبية** | | | | ح ث (8:00-11:00 / 2:00-4:00) | | | | | Sun, Tue (8:00-11:00/2:00-4:00) | | | | | | **Office Hours** | | | | |
| **رقم القاعة**  **Room No.** | | | | **المبنى**  **Building** | | **اليوم**  **Day** | | | **وقت النهاية**  **End Time** | | | | **وقت البدء**  **Start Time** | | **وقت المحاضرة**  **Class Time** | | | | |
| 7512 | | | | 7 | | Sunday, Tuesday | | | 12:05 | | | | 11:15 | | 11:15-12:05 | | | | |
| **مصادر المساق Course Materials** | | | | | | | | | | | | | | | | | | | |
| **الكتاب المقرر Textbook** | | | | | | | | | | | | | | | | | | | |
| Raschka, Sebastian, et al. Machine Learning with PyTorch and Scikit-Learn: Develop machine learning and deep learning models with Python. Packt Publishing Ltd, 2022. | | | | | | | | | | | | | | | | | | | |
| **المراجع ومصادر تعلم المساق Course References and Learning Resources** | | | | | | | | | | | | | | | | | | | |
| Gori, Marco, Alessandro Betti, and Stefano Melacci. Machine Learning: A constraint-based approach. Elsevier, 2023. | | | | | | | | | | | | | | | | | | | |
| **ثانيًا: معلومات المساق SECOND: COURSE OVERVIEW/DESCRIPTION** | | | | | | | | | | | | | | | | | | | |
| This course will give an undergraduate-level introduction to machine learning providing the foundations for mathematical models and algorithms required for machine learning tasks and their applications. Topics will include supervised learning, unsupervised learning, deep learning, and reinforcement learning. This course will put an emphasis on practical applications of machine learning in artificial intelligence such as computer vision, data mining, speech recognition, text processing and bioinformatics. | | | | | | | | | | | | | | | | | | | |
| **أهداف المساق Course Objectives** | | | | | | | | | | | | | | | | | | | |
| **مع نهاية هذا المساق يجب أن يكون الطالب قادرًا على By the end of this course, students should be able to** | | | | | | | | | | | | | | | | | | | |
| الهدف 1 | | | Understanding popular ML algorithms with their associated mathematical foundations for appreciating these algorithms. | | | | | | | | | | | | | | CO1 | | |
| الهدف 2 | | | Capability to implement basic algorithms using basic machine learning libraries mostly in Python. Gain hands-on experience in applying ML to problems encountered in various domains. In addition, obtain exposure to high-level ML libraries or frameworks such as TensorFlow, and PyTorch. | | | | | | | | | | | | | | CO2 | | |
| الهدف 3 | | | Make aware of the role of data in the future of computing, also in solving real-world problems using machine-learning algorithms. | | | | | | | | | | | | | | CO3 | | |
| الهدف 4 | | | Help connect real-world problems to appropriate ML algorithm(s) for solving them. Enable formulating real-world problems as machine learning tasks. | | | | | | | | | | | | | | CO4 | | |
| الهدف 5 | | | Appreciate the mathematical background behind popular ML algorithms. | | | | | | | | | | | | | | CO5 | | |
| **مخرجات التعلم المستهدفة للبرنامج Program Intended Learning Outcomes (PILO)** | | | | | | | | | | | | | | | | | | | |
| **المعرفة والفهم** | م ب1: | | Remembering: Identify and express the fundamental concepts and terminologies of Machine Learning, including essential tools and methods. | | | | | | | | | | | | | | **PILO1** | | **Knowledge and understanding** |
| م ب2: | | Understanding: Recognize the principles and methodologies of machine learning and take an overview of machine learning fields. | | | | | | | | | | | | | | **PILO2** | |
| **المهارات** | م ب3: | | Applying: Solve a wide range of problems that require a suitable knowledge representation and produce the latest developments in the machine learning field. | | | | | | | | | | | | | | **PILO3** | | **Professional Skills** |
| م ب4: | | Analyzing: Analyze, compare, and criticize machine learning algorithms. | | | | | | | | | | | | | | **PILO4** | |
| م ب5: | | Evaluating: Use critical thinking and innovation to mix various machine learning algorithms to solve complex problems. | | | | | | | | | | | | | | **PILO5** | |
| م ب6: | | Communicating: Discuss and work in a group to apply machine learning methodologies in different projects. | | | | | | | | | | | | | | **PILO6** | |
| **الكفايات** | م ب7: | | Self-Development: Plans for self-directed learning and suggests resources and online courses to enhance preparedness for professional certification. | | | | | | | | | | | | | | **PILO7** | | **Competences** |
| م ب8: | | Collaboration: Actively participates as a member or leader in a project team, demonstrating the ability to work independently and collaboratively. | | | | | | | | | | | | | | **PILO8** | |
| م ب9: | | Critical Thinking: Comply, in force and evaluate professional and ethical responsibilities in machine learning practice, based on legislation and ethical standards. | | | | | | | | | | | | | | **PILO9** | |
| **مخرجات التعلم المستهدفة للمساق Course Intended Learning Outcomes (CILO)** | | | | | | | | | | | | | | | | | | | |
| **في نهاية المساق بنجاح يجب أن يكتسب الطالب المخرجات التالية:** | | | | | | | | | | **Successful completion of the course should lead to the following outcomes:** | | | | | | | | | |
| **المعرفة والفهم** | م م1: | | Understand the principles and techniques related to machine learning methods. | | | | | | | | | | | | | | **CILO1** | | **Knowledge and understanding** |
| م م2: | | Understand the application of machine learning in data, image and business context. | | | | | | | | | | | | | | **CILO2** | |
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| **المهارات** | م م3: | | Assesses gaps and weaknesses in machine learning algorithms. | | | | | | | | | | | | | | **CILO3** | | **Professional Skills** |
| م م4: | | Improve at least one of the machine learning algorithms. | | | | | | | | | | | | | | **CILO4** | |
| م م5: | | Uses best practices and standards in the field of data extraction and classification for various organizations using machine learning algorithms. | | | | | | | | | | | | | | **CILO5** | |
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| **الكفايات** | م م6: | | Make aware of the role of data in the future of computing, and also in solving real-world problems using machine learning algorithms. | | | | | | | | | | | | | | **CILO6** | | **Competences** |
| م م7: | | Help connect real-world problems to appropriate ML algorithm(s) for solving them. Enable formulating real-world problems as machine learning tasks. | | | | | | | | | | | | | | **CILO7** | |
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| **موائمة مخرجات التعلم للمساق (CILOs) مع مخرجات التعلم للبرنامج (PILOs)** | | | | | | | | | | | **Mapping Course Learning Outcomes (CILOs) to Program Learning Outcomes (PILOs)** | | | | | | | | | |
| **PILO9** | | **PILO8** | | | **PILO7** | | **PILO6** | **PILO5** | | | **PILO4** | **PILO3** | | **PILO2** | | **PILO1** | |  | | |
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| **مخطط المساق (الموضوعات) Topic Outline / Schedule (Syllabus)** | | | | | | |
| **الوقت \ الموعد Duration / Deadlines** | **أنشطة التدريس والتعلم Teaching & Learning Activity** | **رمز مخرجات البرنامج**  **PILO** | **رمز مخرجات المساق**  **CILO** | **القراءات (المراجع)**  **Readings (Reference)** | **مواضيع المساق –الفعاليات**  **Course Topics / Events** | **الأسبوع**  **Week** |
| 3- Hours | Theoretical lectures and presentations | 3,4,5 | 1,2,3 | Textbook / Chapter 1 | Introduction to ML Reinforcement Learning  Unsupervised Learning  Supervised Learning |  |
| 3- Hours | Theoretical lectures and presentations | 3,4,5 | 1,2,3 | Textbook / Chapter 1 | Ambitions and Goals of Machine Learning |  |
| 3- Hours | Theoretical lectures and presentations | 3,4,5 | 1,2,3 | Textbook / Chapter 1 | A roadmap for building machine learning systems |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 2,3 | Textbook / Chapter 2 | Using Python for machine learning |  |
| 3- Hours | Theoretical lectures and presentations | 3,4,5 | 1,2,3 | Textbook / Chapter 3 | Machine Learning and data |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 4 | Training Simple Machine Learning Algorithms for Feature Extraction |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 4 | Training Simple Machine Learning Algorithms for Classification |  |
|  |  |  |  |  | Midterm Exam |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 4 | Building Good Training Datasets – Data Preprocessing |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 4 | Building Good Training Datasets – Data Preprocessing |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 5,6,7 | Textbook / Chapter 5 | Applying Machine Learning to different fields |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 5,6,7 | Textbook / Chapter 5 | Applying Machine Learning to different fields |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 6 | Learning Best Practices for Model Evaluation and Hyperparameter Tuning |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3,4,5 | Textbook / Chapter 6 | Learning Best Practices for Model Evaluation and Hyperparameter Tuning |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 3-7 | Textbook / Chapter 7 | Using Machine Learning to predicting |  |
| 3- Hours | Theoretical lectures, practical, and presentations | 3,4,5 | 1-7 | Textbook / Chapters 1- 7 | Revision & lessons  learned |  |

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| **أساليب التقييم Assessment Methods** | | | | |
| أكتب أساليب التقييم التي سيتم استخدامها لتقييم قدرة الطلبة على استيعاب مواد المساق واكتساب المهارات والكفايات المنصوص عليها في مخرجات التعلم | | | Write the assessment methods that will be used to evaluate students’ ability to comprehend the course material and acquire the skills and competencies specified in the learning outcomes. | |
| **النسبة %**  **Percentage** | **العلامة**  **Grade** | **رمز مخرجات المساق المستهدفة CILO** | **النوع (تكويني أو تجميعي)**  **Type (Informative and Summative)** | **وسيلة التقييم**  **Assessment Methods** |
| 5% | 5 | 1-7 | Informative | المشاركة (Participation) |
| - | - | - | - | تقرير (Report) |
| 5% | 5 | - | - | المقالات المختصرة (Essays) |
| 5% | 5 | 1-7 | Summative | واجبات (Assignments) |
| - | - | 1-7 | Informative | الاختبارات الشفوية (Oral Exams) |
| - | - | 1-7 | Informative | دراسة الحالة (Case Study) |
| 5% | 5 | 1-7 | Summative | امتحانات قصيرة (Quizzes) |
| - | - | - | - | التجارب العملية (Experiments) |
| 10% | 10 | - | - | مشاريع (Projects) |
| - | - | - | - | زيارات ميدانية (Field Trip) |
| - | - | - | - | أخرى (يرجى التحديد) (Other-Specify) |
| 30% | 30 | 1,2,3,4 | Summative | امتحان منتصف الفصل (Mid Exam) |
| 40% | 40 | 1-7 | Summative | الامتحان النهائي (Final Exam) |
|  | 100 |  |  | المجموع (Total) |

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| **ثالثًا: التعليمات والإرشادات Third: Course Policies and Instructions** | |
| **الحضور والمواظبة Attendance Rules** | |
| يعتبر حضور الطلبة للمحاضرات ومشاركتهم بها في غاية الأهمية، وسيتم تطبيق القواعد المعمول بها في الجامعة بهذا الخصوص. يتم تسجيل حضور الطلبة في كل محاضرة، وفي حال وصول نسبة غياب الطالب إلى %10 ستتسبب في تلقيه إنذاراً أولياً خطياً، أما في حال وصول نسبة الغيابات إلى %15 يتم حرمان الطالب من المساق ولن يسمح للطالب بالتقدم للامتحان النهائي في المساق. في حال تعرض الطالب إلى أي ظروف قاهرة (مرض أو ظروف شخصية)، يجدر بالطالب التواصل مع المدرس ومناقشة هذا الظرف وإظهار دليل خطي يبرر الظرف ليتم الغاء الغياب من سجل الغياب. | Student attendance and participation in lectures is of utmost importance, and the university’s rules will be applied in this regard. Student attendance is recorded in each lecture, and if the student’s absence rate reaches 10%, he/she will receive a written warning. If the absence rate reaches 15%, the student will be suspended from the course and will not be allowed to take the final exam in the course. If the student is exposed to any force majeure circumstances (illness or personal circumstances), the student should contact the instructor and discuss this circumstance and provide written evidence justifying the circumstance in order for the absence to be removed from the absence record. |

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| **السياسات والإرشادات Policies and Instructions** | |
| 1. يجب على الطالب أن يقوم بقراءة واتباع اللوائح الداخلية الخاصة بجامعة فيالدلفيا المتعلقة بلوائح سلوك الطلبة. 2. ينصح الطلبة من ذوي االحتياجات الخاصة أن يقوموا بتسجيل حالاتهم لدى شؤون الطلبة من خلال تقرير طبي حسب الأصول وساري المفعول. 3. يخضع الطلبة من ذوي الاحتياجات الخاصة إلى رعاية خاصة وذلك بالتنسيق مع رئيس القسم وفقاً للمعايير الخاصة بذلك والمعترف بها دولياً. 4. على الطالب الاستئذان قبل القيام بأي مداخلات على موضوع المحاضرة. 5. على الطالب الاستماع واحترام الرأي الآخر. 6. على الطالب عدم إعاقة سير المحاضرة. 7. على الطالب عدم التردد في طرح الأسئلة على مدرس المادة والتواصل مع المدرس خلال الساعات المكتبية او من خلال نظام التعليم الالكتروني. 8. على الطالب عدم استخدام الهاتف النقال أثناء المحاضرة. 9. غير مسموح الغش والانتحال على الاطلاق. | 1. The student must read and follow the internal regulations of Philadelphia University regarding student conduct regulations. 2. Students with special needs are advised to register their cases with Student Affairs through a valid and duly issued medical report. 3. Students with special needs are subject to special care in coordination with the head of the department according to the relevant and internationally recognized standards. 4. The student must ask permission before making any interventions on the lecture topic. 5. The student must listen and respect the opinions of others. 6. The student must not obstruct the lecture. 7. The student must not hesitate to ask questions to the course instructor and communicate with the instructor during office hours or through the e-learning system. 8. The student must not use a mobile phone during the lecture. 9. Cheating and plagiarism are absolutely not allowed. |

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| **منسق المادة Course Coordinator** | | | |
| **Fadi M. S. Alsuhimat** | **رئيس القسم**  **Head Department** | **Fadi M. S. Alsuhimat** | **منسق المادة**  **Course Coordinator** |
| **18/10/2024** | **التاريخ:**  **Date:** | **18/10/2024** | **التاريخ:**  **Date:** |
|  |  |  |  |