

| Nr.crt. | Titlu lucrare                                                                                                                  | Scurta descriere                                                                                                                                                                                                                                                                                                                                                                                                                                              | Cerinte                                                                                                                         | Nivel (licenta/master) |
|---------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|------------------------|
| 1       | Forecasting patient demand in hospitals using Machine Learning (ML) or/and Deep Learning (DL)                                  | Literature review and development of a predictive model to estimate demand for outpatient visits in a hospital department. The implementation involves identifying relevant features from patient and scheduling data, preparing a time-series dataset, and implementing forecasting methods (e.g., XGBoost, Random Forest, baseline statistical models). The study evaluates model accuracy and translates forecasts into capacity planning recommendations. | Python, Data analysis, Time series forecasting, Machine learning, Statistics, Healthcare systems.                               | Licență                |
| 2       | Comparative forecasting of patient demand in outpatient healthcare using Machine Learning (ML) and Stochastic Petri Nets (SPN) | Literature review and development of two predictive models to estimate demand for outpatient visits in a hospital department. The first model will use data-driven forecasting method to predict patient arrivals and demand trends. The second model will use Stochastic Petri Nets (SPN) to simulate patient flow, capacity constraints, and uncertainty in hospital operations. The study compares                                                         | Python or MATLAB, Data analysis, Machine learning / Deep learning, Modelling and simulation, Stochastic Petri Nets, Statistics. | Licență/Master         |

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|   |                                                                                               | both approaches in terms of accuracy, interpretability, and their contribution to hospital capacity planning and decision support.                                                                                                                                                                                                                                                                              |                                                                                                                                          |         |
| 3 | IoT security and standardization: A comparative analysis of current challenges and approaches | Comparative research focused on existing IoT security frameworks and international standardization approaches. The dissertation involves analyzing how current standards address interoperability and cybersecurity risks across IoT architectures, identifying gaps, and proposing possible improvements or alignment strategies between security practices and international standards.                       | Knowledge of IoT architectures and cybersecurity principles, familiarity with international standards.                                   | Master  |
| 4 | Modelling and evaluation of IoT system reliability and availability                           | Literature review and implementation of a simulation-based model to evaluate the reliability and availability of an IoT system. The work involves representing the IoT architecture through reliability modelling techniques, identifying critical components, and modeling system reliability and availability. The study combines theoretical analysis with practical implementation using a simulation tool. | Reliability and diagnosis, IoT architectures, Probability and stochastic modelling, Programming (C, Python or MATLAB), Simulation tools. | Licență |

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| 5 | Data aware embedded Machine Learning<br>2 lucrări licență                              | Literature review and practical implementation of artificial intelligence methods on microcontroller platforms, focusing on data-aware optimization. The work involves studying edge AI and embedded machine learning approaches, analyzing how AI models can adapt to the characteristics of input data (e.g., variability, frequency, or noise), and implementing a prototype that demonstrates improved performance and energy efficiency through adaptive data processing. | Microcontroller programming (C/C++ ), embedded systems, Machine learning and AI fundamentals, data processing and optimization, familiarity with AI frameworks for microcontrollers, TensorFlow Lite, Edge Impulse or TinyML. | Licență   |
| 6 | Predictive maintenance for industrial equipment using IoT devices<br>2 lucrări licență | Literature review and development of a predictive maintenance model for industrial equipment based on IoT devices. The work includes identifying relevant sensor data, implementing data collection on a microcontroller platform, and developing an algorithm for early fault detection and maintenance prediction.                                                                                                                                                           | Knowledge of IoT architectures, Embedded systems, Microcontroller programming (C/C++ or MicroPython), Sensor data acquisition and processing, Basic machine learning or anomaly detection                                     | Licență   |
| 7 | Topics to be defined by the student                                                    | Students may propose their own research topic, provided they aligns with my areas of expertise and ongoing research directions.                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                               | Master IA |