MICROCREDENTIAL IN DATA ANALYSIS FOR HEALTHCARE PROFESSIONALS

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Micro-GEAR

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Health Data Analytics

Microcredential in Big Data Analysis for Healthcare Professionals (Python/R)

Why Is Health Data Analytics Essential Today?

- Healthcare systems are transitioning toward data-driven decision-making.
- The use of electronic health records (EHR), wearable sensors, and biometric devices has grown rapidly.
- Post-COVID environments require increased capacity for epidemiological forecasting.
- Leading nations employ ML/AI tools for diagnostics, risk assessment, and resource planning.
- Lack of analytical skills in Georgia limits evidence-based decision-making in medicine and public health.

Market Demand and Industry Requirements

- Demand for data scientists is increasing by 27–30% annually worldwide (OECD, WEF).
- The demand for data analysts in healthcare is reinforced by WHO and EU Health Data Space recommendations.
- In Georgia, both public and private sectors are upgrading EHR systems → requiring trained personnel.
- There was no short, practical, modular program connecting Python/R with health datasets.

International Experience

- Harvard T.H. Chan School – Clinical Data Science Certificate (R/Python)
- Johns Hopkins University – Health Data Science Specializations
- University of Oxford – Health Data Science MSc (modular structure)
- EIT Health (EU) – Microcourses in Data Governance, AI in Healthcare, ML

Target Groups in Georgia

Who Needs This Program in Georgia?

- Physicians and clinical staff
- Medical research centers
- Public health professionals
- Healthcare administration specialists
- Insurance industry analysts
- Pharmacy chains and pharmaceutical companies
- Digital Health and MedTech startups

Readiness and Need for Training

Knowledge Level and the Need for Upskilling

Research findings show:

- 70% of potential learners lack basic programming experience.
- 90% want to use data for research and clinical decision-making.
- Demand exists for “step-by-step,” practice-oriented instruction adapted to healthcare.
- Existing IT programs do not cover healthcare-specific data (FHIR, ICD, CPT, clinical text).

➲ A three-tier structure (Beginner → Intermediate → Professional) is the optimal solution.

Course Design: Three-Level Model

- Ensures progressive skill development.
- Each level has its own objectives, outcomes, and workload.
- Stackability allows flexible participation and completion.
- Supports lifelong learning and continuous professional development.

Levels:

1. **Beginner Level – 1.5 ECTS**
2. **Intermediate Level – 2 ECTS**
3. **Professional / Advanced Level – 2.5 ECTS**

Module Objectives and Outcomes

Beginner Level (1.5 ECTS)

Objective: Basics of programming (Python/R), data cleaning, visualization

Outcomes:

- Ability to load, clean, and explore datasets
- Produce simple visualizations
- Understand fundamentals of ethics and data privacy

Module Objectives and Outcomes

Intermediate Level (2 ECTS)

Objective: Statistical analysis, basic ML, SQL, FHIR

Outcomes:

- Hypothesis testing, regression models
- Build basic machine learning models
- Manage databases and structured health data

Module Objectives and Outcomes

Professional / Advanced Level (2.5 ECTS)

Objective: Deep Learning, NLP, Big Data, Capstone

Outcomes:

- Apply CNN/RNN models to medical imaging
- Perform clinical NLP on healthcare text
- Conduct large-scale analytics (Spark/Hadoop)
- Complete an independent Capstone project

Course Workload

Total program: 6 ECTS (150 hours)

- Beginner: 1.5 ECTS → 40 hours
- Intermediate: 2 ECTS → 50 hours
- Advanced: 2.5 ECTS → 60 hours

ECTS is calculated according to European norms: 1 credit = 25–30 hours.

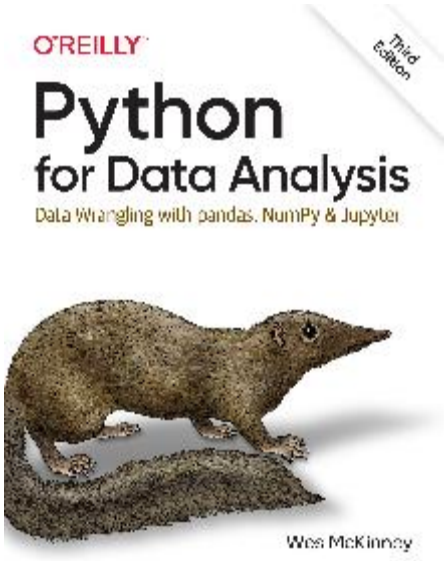
Course Summary

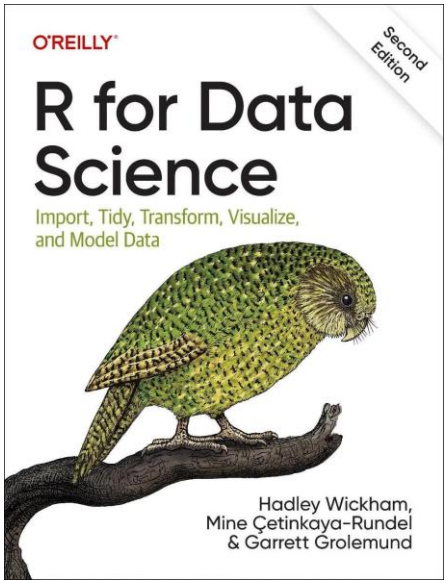
Key Course Topics

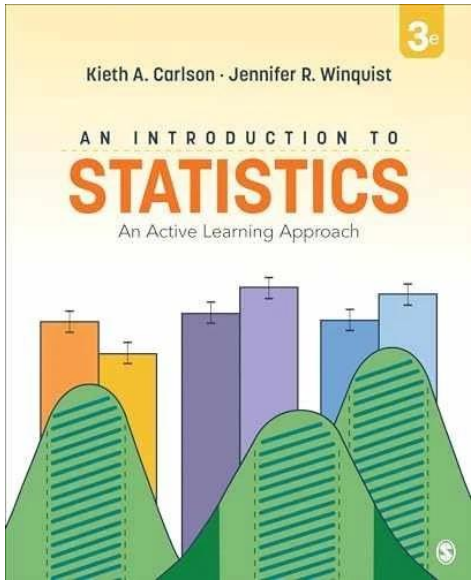
- Healthcare data sources and structures
- Python and R for analytics
- Statistical analysis and hypothesis testing
- Machine learning models
- NLP, Imaging AI, Big Data ecosystems
- Cloud technologies (AWS, GCP, Azure)
- Data governance, ethics, GDPR/HIPAA
- Capstone project using real health datasets

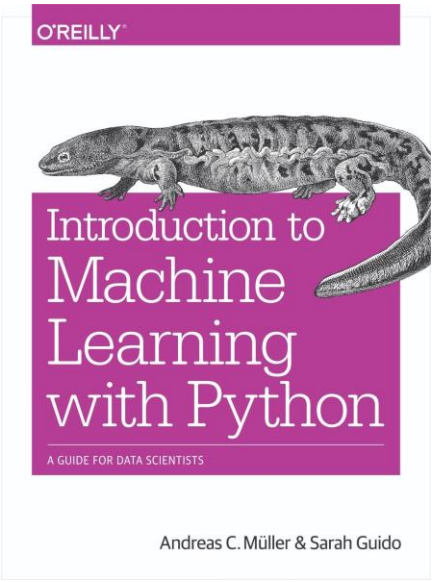
Recommended Reading

- Wes McKinney – Python for Data Analysis
- Hadley Wickham – R for Data ScienceI
- SPOR – Health Economics and Data Analytics
- WHO – Digital Health Guidelines
- James et al. – An Introduction to Statistical Learning
- Aurélien Géron – Hands-On Machine Learning









Assessment System

- Continuous assessment
- End-of-module quizzes
- Python/R assignments
- Group analytical projects
- Capstone Project (50% at Advanced level)
- Evaluation criteria: accuracy, reproducibility, interpretation, visualization quality

Development Prospects and Sustainability

- Ongoing updates aligned with needs of hospitals, ministries, and private sector
- Europass Digital Credential issuance
- Integration into Master's-level programs (stackable pathway)
- Collaboration with international platforms (EIT Health, WHO Academy)
- Hybrid delivery enabling long-term scalability and accessibility