Explainable AI for Clinical Decision Support Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

The rise of Artificial Intelligence (AI) in healthcare has transformed patient care, diagnostics, and treatment planning. However, the black-box nature of many AI systems poses challenges for clinical trust, regulatory compliance, and ethical transparency. Explainable AI (XAI) for Clinical Decision Support Training Course is strategically designed to equip healthcare professionals, data scientists, and AI engineers with the skills to design, deploy, and evaluate interpretable AI models that enhance clinical decision-making. The course focuses on explainability, transparency, and accountability, which are critical for ensuring patient safety, clinician trust, and regulatory alignment.

Participants will gain in-depth knowledge of XAI techniques, model interpretability tools, and real-world healthcare applications across imaging, diagnostics, and personalized treatment. By the end of the course, learners will be capable of implementing robust explainable models, interpreting complex outputs, and integrating these models into Electronic Health Records (EHRs) and Clinical Decision Support Systems (CDSS). Through a blend of theoretical foundations, hands-on labs, and healthcare case studies, learners will emerge with competencies aligned with ethical AI, regulatory guidelines, and clinical workflow integration.

Programme Curriculum

Explainable AI for Clinical Decision Support Training Course

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Course Objectives

1. Understand the fundamentals of Explainable AI (XAI) in clinical settings
2. Evaluate the importance of transparency and accountability in AI-driven healthcare
3. Identify key explainability tools (e.g., SHAP, LIME, Grad-CAM) for model interpretation
4. Integrate XAI models into existing Clinical Decision Support Systems (CDSS)
5. Analyze ethical and regulatory challenges of opaque AI models in healthcare
6. Apply XAI for image-based diagnostics and predictive analytics
7. Design interpretable machine learning models for patient-specific recommendations
8. Explore Natural Language Processing (NLP) in explainable healthcare applications
9. Use XAI in Electronic Health Record (EHR) analysis
10. Develop human-in-the-loop systems for collaborative clinical decision-making
11. Implement risk assessment using interpretable AI models
12. Visualize AI decisions for enhanced clinician trust and usability
13. Align explainable AI strategies with GDPR, HIPAA, and FDA AI/ML guidance

Target Audiences

1. Medical doctors and clinicians using AI tools
2. Clinical informatics specialists
3. Healthcare data scientists
4. AI/ML researchers in biomedical domains
5. Health IT managers and system developers
6. Regulatory compliance officers in healthcare AI
7. Bioethics professionals
8. Academic faculty and graduate students in health tech

Course Duration: 10 days

Course Modules

Module 1: Foundations of Explainable AI in Healthcare

- Introduction to AI in clinical practice
- Importance of explainability in healthcare
- XAI vs. black-box models
- Key XAI principles: transparency, trust, fairness
- Challenges in deploying XAI in real-world settings
- **Case Study: Predictive modeling for hospital readmission**

Module 2: Overview of Clinical Decision Support Systems (CDSS)

- CDSS structure and workflow
- Integration with Electronic Health Records
- Types of decision support: diagnostic, treatment, alerts
- Importance of explainability in CDSS adoption

- Evaluation metrics for CDSS performance
- **Case Study: CDSS for sepsis early warning systems**

Module 3: Interpretable Machine Learning Models

- Linear regression, decision trees, rule-based models
- Trade-offs between performance and interpretability
- Choosing models for clinical applications
- Handling bias and confounding variables
- Visual tools for model interpretation
- **Case Study: Risk scoring for cardiovascular events**

Module 4: SHAP and LIME for Local Interpretability

- SHAP (Shapley Additive Explanations) fundamentals
- LIME (Local Interpretable Model-Agnostic Explanations) basics
- Interpreting individual predictions
- Limitations and best practices
- Visualization and report generation
- **Case Study: Diagnosing diabetes from EHR data**

Module 5: Deep Learning and XAI in Medical Imaging

- Convolutional Neural Networks (CNNs) in radiology
- Grad-CAM for visual explanation
- Image segmentation and feature attribution
- Model calibration and uncertainty
- Importance of visual interpretability in diagnosis
- **Case Study: AI in chest X-ray classification**

Module 6: NLP and Explainability in Clinical Texts

- Basics of NLP in healthcare
- Entity recognition and topic modeling
- Explainability in transformer models (e.g., BERT)
- Visualizing attention mechanisms
- Clinical use-cases of NLP explainability
- **Case Study: AI in clinical note triage**

Module 7: Integration of XAI into EHR Systems

- Data preprocessing and normalization
- Feature engineering with clinical variables
- Challenges of data heterogeneity
- Real-time decision support with explainable output
- Privacy-preserving explainable models
- **Case Study: Predictive modeling of ICU outcomes**

Module 8: Human-in-the-Loop AI in Healthcare

- Collaborative decision-making
- Incorporating clinician feedback
- Interface design for XAI tools
- Alert fatigue and explainability
- Adaptive learning with human input
- **Case Study: Clinical decision support in oncology**

Module 9: Visual Analytics for AI Decision Explanations

- Dashboard design for clinicians
- Tools for visualizing model outputs
- Enhancing comprehension through visualization
- Patient-friendly visual communication
- Cognitive load and design considerations
- **Case Study: Stroke prediction visualization interface**

Module 10: Bias, Fairness, and Ethical AI

- Detecting and mitigating algorithmic bias
- Fairness metrics in healthcare AI
- Transparency in clinical algorithms
- Ethical concerns in black-box models
- Inclusive datasets for health equity
- **Case Study: Disparity analysis in AI-based triage tools**

Module 11: Regulatory Frameworks and XAI Compliance

- Overview of GDPR, HIPAA, and FDA guidance
- Model documentation and audit trails
- Explainability in AI/ML software as a medical device
- Liability concerns in AI decisions
- Legal obligations for informed consent
- **Case Study: FDA-approved explainable AI tools**

Module 12: Designing and Testing Explainable AI Prototypes

- User-centered design principles
- Prototyping interpretable systems
- Usability testing with clinicians
- Iterative refinement of XAI models
- Metrics for evaluation and feedback
- **Case Study: AI-assisted clinical triage prototype**

Module 13: Risk Assessment with Interpretable Models

- Defining and calculating clinical risks
- Use of logistic regression and decision thresholds
- Communicating risk to patients
- Comparative risk profiling
- Decision curve analysis
- **Case Study: Predicting maternal complications using XAI**

Module 14: Model Deployment and Monitoring

- Transitioning from development to deployment
- Explainability in model updates
- Drift detection and retraining
- Monitoring interpretability metrics
- Logging and transparency features
- **Case Study: Live deployment in a rural health facility**

Module 15: Capstone Project and Presentation

- Group project: Build an explainable CDSS

- Evaluation of explainability effectiveness
- Presentation to clinical stakeholders
- Peer review and feedback
- Certification and career guidance
- **Case Study: Real-world implementation proposal**

Training Methodology

- Interactive lectures covering core concepts and techniques
- Hands-on labs with real clinical datasets and model interpretation tools
- Breakout sessions for group work and case study analysis
- Guest lectures from experts in clinical AI and bioethics
- Capstone project integrating knowledge into practice
- Continuous assessment through quizzes and assignments

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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