Neuroscience Data Analysis and Brain Imaging Training Course

Professional Development Training Course Outline

Category	Research and Data Analysis	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Neuroscience is at the forefront of understanding the human brain and behavior, and the integration of data analysis with brain imaging technologies has revolutionized the field. Neuroscience Data Analysis and Brain Imaging Training Course is designed for professionals, students, and researchers who wish to master advanced techniques in neuroimaging analysis, functional brain mapping, statistical modeling, and machine learning in neuroscience. Participants will gain hands-on experience with tools such as fMRI, EEG, MEG, DTI, and MRI, exploring how data-driven decisions can lead to breakthroughs in neurological and psychological research.

The course emphasizes real-world case studies, data interpretation, and visualization using cutting-edge software such as SPM, FSL, AFNI, BrainVoyager, MATLAB, Python, and R. It aims to bridge the gap between neuroscience theory and computational practice, equipping learners with the technical skills, analytical mindset, and scientific rigor required for impactful neuroscience research. With a focus on open science, reproducibility, and AI-driven brain decoding, this course aligns with global research demands and industry innovation.

Programme Curriculum

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Course Objectives

1. Understand the fundamentals of neuroscience data analysis and brain imaging techniques.
2. Analyze and interpret data from fMRI, EEG, MEG, and DTI scans.
3. Use Python and MATLAB for neuroimaging data processing and visualization.
4. Apply machine learning and AI models to brain imaging datasets.
5. Explore real-time neurofeedback and brain-computer interface (BCI) systems.
6. Perform statistical inference and Bayesian modeling in neuroscience.
7. Integrate multi-modal imaging data for comprehensive brain analysis.
8. Utilize SPM, FSL, and AFNI for advanced neuroimaging workflows.
9. Ensure data reproducibility and ethical standards in neuroscience research.
10. Learn to prepare brain imaging data for peer-reviewed publications.
11. Conduct functional and structural connectivity analysis.
12. Interpret clinical neuroimaging data for diagnosis and research.
13. Build interactive neuroscience dashboards using open-source tools.

Target Audience

1. Neuroscientists and Neuropsychologists
2. Data Scientists and AI Researchers
3. Biomedical Engineers
4. Cognitive Science Students
5. Radiologists and Imaging Technicians
6. Medical Students and Professionals
7. Academic Researchers and PhD Candidates
8. Mental Health Professionals

Course Duration: 5 days

Course Modules

Module 1: Introduction to Neuroscience and Brain Imaging

- Basics of brain anatomy and function
- Overview of neuroimaging technologies (EEG, fMRI, MEG, DTI)
- Types of brain data and their applications
- Signal acquisition and preprocessing
- Introduction to neuroinformatics
- **Case Study: Comparison of structural vs. functional brain scans**

Module 2: Neuroimaging Data Acquisition and Preprocessing

- Principles of MRI, fMRI, and EEG data acquisition
- Noise reduction techniques
- Motion correction and slice timing
- Brain extraction and normalization
- Software overview: SPM, FSL, BrainVoyager
- **Case Study: Preprocessing pipeline for resting-state fMRI**

Module 3: Statistical Methods in Neuroimaging

- General Linear Model (GLM) for brain imaging
- Correction for multiple comparisons
- ROI and voxel-based analysis
- Parametric vs non-parametric testing
- Bayesian statistics in brain imaging
- **Case Study: Analyzing task-based fMRI for language mapping**

Module 4: Machine Learning in Brain Imaging

- Introduction to machine learning and AI in neuroscience
- Feature extraction and selection from neuroimaging data
- Classification and prediction models
- Deep learning for brain decoding
- Cross-validation and model evaluation
- **Case Study: Using SVM to predict cognitive states from fMRI**

Module 5: Brain Connectivity Analysis

- Functional vs structural connectivity
- Graph theory and network neuroscience
- Diffusion tensor imaging (DTI) for structural pathways
- Dynamic causal modeling
- Brain networks and disorders
- **Case Study: Mapping the default mode network in Alzheimer's disease**

Module 6: EEG and MEG Data Analysis

- Basics of EEG/MEG signal interpretation
- Time-frequency analysis
- Source localization techniques
- Artifact rejection and data filtering
- Real-time EEG applications in BCI
- **Case Study: Cognitive load assessment using EEG**

Module 7: Clinical Applications and Ethical Considerations

- Neuroimaging in psychiatric and neurological disorders
- Imaging biomarkers for early diagnosis
- Neuroethics and data privacy
- Guidelines for reproducible research
- Interpretation of clinical neuroimaging reports
- **Case Study: Brain imaging for early detection of schizophrenia**

Module 8: Visualizing and Communicating Neuroimaging Results

- Data visualization tools (BrainNet Viewer, Nilearn, etc.)
- Interactive dashboards for brain data
- Creating publication-quality figures
- Reporting standards and best practices
- Data sharing and open science platforms
- **Case Study: Preparing a neuroimaging report for a journal submission**

Training Methodology

- Interactive lectures and demonstrations

- Hands-on workshops with real datasets
- Group discussions and collaborative analysis
- Software-based practical sessions (MATLAB, Python, FSL, SPM)
- Real-world case studies and problem-solving
- Quizzes and peer-reviewed 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	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

Ready to enroll or request a customized program? Book online or contact us:

Register Online Now

Email: info@fineskilltrainingcenter.com | Website: www.fineskilltrainingcenter.com