Ecological Niche Modeling and Species Distribution 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

In an era marked by rapid biodiversity loss and climate change, Ecological Niche Modeling (ENM) and Species Distribution Modeling (SDM) have emerged as powerful tools for predicting species habitats and guiding conservation strategies. Ecological Niche Modeling and Species Distribution Training Course provides a robust framework for understanding and applying ENM/SDM using advanced computational tools, geospatial analysis, and environmental datasets. Whether you're working in conservation biology, climate change impact studies, or ecosystem management, this course equips you with the necessary skills to model ecological niches and predict species distributions with scientific accuracy.

Designed for ecologists, researchers, environmental scientists, and GIS analysts, this training emphasizes practical application through real-world case studies, hands-on exercises, and open-source tools like MaxEnt, R, and QGIS. Participants will develop a data-driven understanding of how environmental variables influence species distribution patterns, and how to utilize predictive models for conservation planning, invasive species monitoring, and policy-making.

Programme Curriculum

Ecological Niche Modeling and Species Distribution Training Course

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Course Objectives

1. Understand key principles of ecological niche theory and species distribution modeling.
2. Explore the role of climate and environmental variables in species distributions.
3. Learn data sourcing and preprocessing using remote sensing and geospatial datasets.
4. Apply MaxEnt software for predictive modeling of species niches.
5. Implement R programming for advanced statistical modeling and visualization.
6. Interpret and validate ENM/SDM model results for scientific research and decision-making.
7. Conduct gap analysis for biodiversity conservation using spatial data.
8. Address model overfitting, bias correction, and validation metrics.
9. Integrate land use, habitat fragmentation, and climate scenarios into models.
10. Use ensemble modeling techniques for improved prediction accuracy.
11. Develop and present scientific reports using ENM/SDM outputs.
12. Understand legal, ethical, and conservation implications of ENM applications.
13. Apply modeling techniques in case studies for endangered, invasive, and migratory species.

Target Audiences

1. Environmental Scientists
2. Conservation Biologists
3. Ecologists
4. GIS Analysts
5. Wildlife Managers
6. Climate Change Researchers
7. Natural Resource Planners
8. Graduate Students in Ecology & Environmental Sciences

Course Duration: 5 days

Course Modules

Module 1: Introduction to Ecological Niche Modeling

- Overview of ENM and SDM concepts
- Historical evolution and applications
- Understanding fundamental vs. realized niche
- Introduction to key modeling tools
- Types of environmental predictors
- **Case Study: Predicting amphibian habitats in tropical forests**

Module 2: Data Collection and Preprocessing

- Occurrence data sources: GBIF, iNaturalist
- Environmental variables: Bioclim, NDVI, DEM
- Data cleaning and bias removal techniques
- Coordinate systems and spatial accuracy
- Software tools for data preparation

- **Case Study: Cleaning and prepping data for butterfly species in Asia**

Module 3: Using MaxEnt for Modeling

- Installing and navigating MaxEnt
- Model parameterization and tuning
- Running and interpreting MaxEnt models
- Response curves and variable importance
- Limitations and troubleshooting
- **Case Study: MaxEnt modeling of an endangered bird species**

Module 4: Advanced Modeling in R

- Introduction to relevant R packages (dismo, biomod2)
- Spatial data handling and visualization
- Running models and evaluating results
- Ensemble modeling techniques
- Automating workflows with scripts
- **Case Study: Modeling invasive species in agricultural zones**

Module 5: Model Evaluation and Validation

- Evaluation metrics (AUC, TSS, Kappa)
- Cross-validation and bootstrapping
- Understanding thresholding and ROC curves
- Identifying overfitting and model bias
- Model uncertainty assessment
- **Case Study: Comparing SDM results for different validation approaches**

Module 6: Integrating Climate and Land Use Scenarios

- Climate projections and scenarios (CMIP6, RCPs)
- Land use change models and data (LUH2)
- Combining climate and land data in models
- Forecasting future species distributions
- Climate adaptation strategies
- **Case Study: Predicting mammal shifts under climate change**

Module 7: Applications in Conservation and Management

- Biodiversity hotspots mapping
- Corridor and protected area design
- Invasive species risk assessment
- Conservation prioritization
- Stakeholder communication using model outputs
- **Case Study: Designing a protected area network for reptiles**

Module 8: Reporting and Publishing Results

- Writing scientific reports and papers
- Visualizing and mapping results
- Sharing models and reproducibility
- Ethical considerations in ecological modeling
- Data sharing and FAIR principles
- **Case Study: Publishing an SDM study in an ecology journal**

Training Methodology

- Interactive lectures with real-time demonstrations
- Hands-on sessions using MaxEnt, R, and GIS tools
- Practical assignments using global datasets
- Guided step-by-step modeling workflows
- Peer collaboration and expert feedback
- Capstone project involving independent case study

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

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Physical	$4,500
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