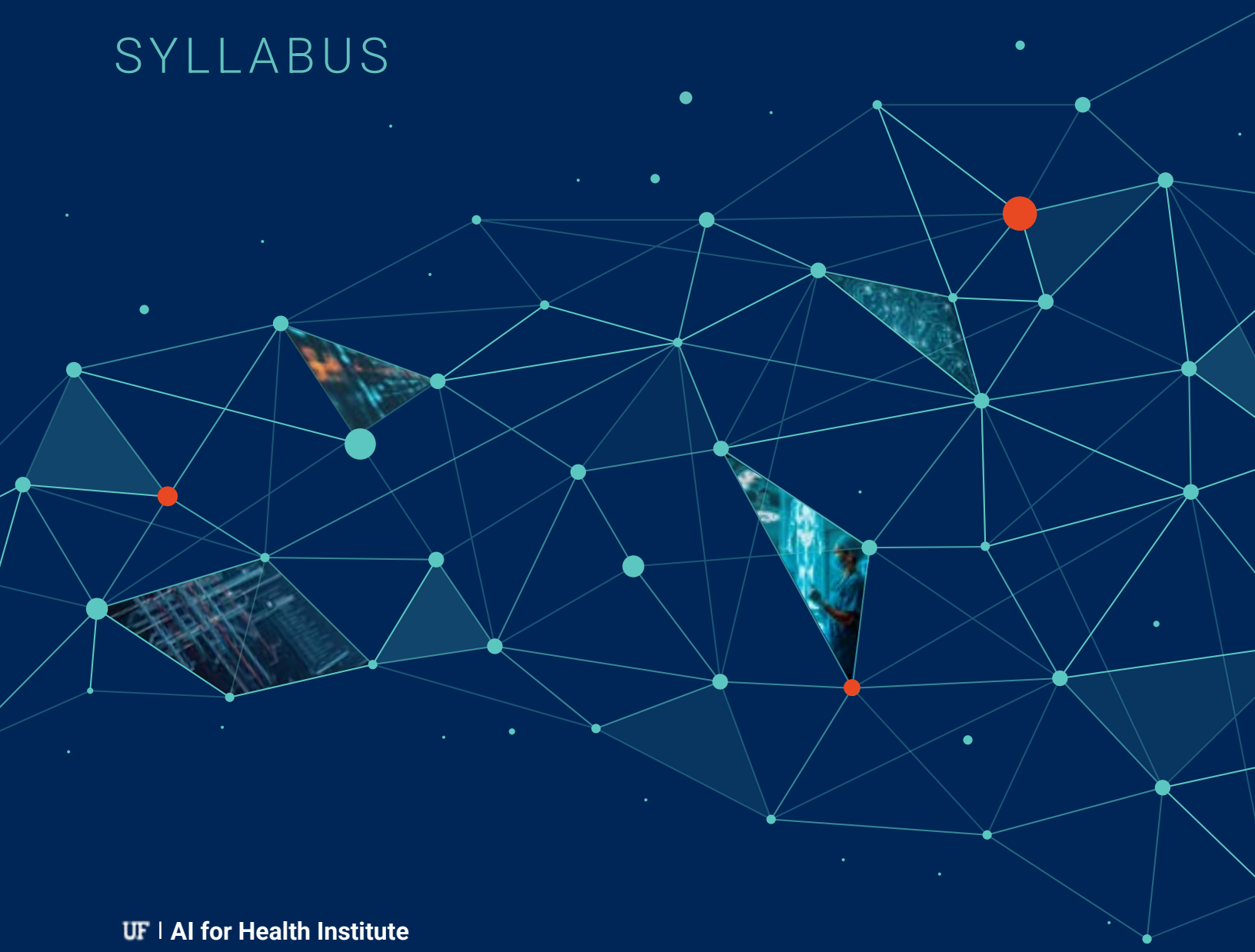
AI Passport

AI Passport · Fundamentals

SYLLABUS



UF | AI for Health Institute

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Funded by the **NIH IPERT program**, the AI Passport is a national initiative to rapidly upskill healthcare providers and biomedical and clinical researchers with the foundations of artificial intelligence.

Across this 14-week program, you will build a shared vocabulary of AI, explore the ethical and regulatory landscape, strengthen your ability to design and evaluate experiments, and gain hands-on experience with biomedical data, imaging, machine learning, deep learning, and generative AI. Through peer collaboration, expert mentorship, and a culminating impact project, you will practice applying these skills to real-world healthcare challenges, equipping you to responsibly integrate AI into your own research and clinical practice.

From fundamentals to real-world projects, this program equips you to integrate AI into biomedical research and healthcare practice.

We are the last generation of doctors who trained without AI and the first to imagine what comes next.

Welcome to the AI Passport.

We designed this program to prepare the biomedical and clinical research community for the era of AI. Alongside my colleagues, I'm excited to guide you in building the skills, practices, and perspectives that will help you lead in this transformation.

Azra Bihorac, MD, MS, is the R. Glenn Davis Distinguished Professor of Medicine, Surgery and Anesthesiology at the University of Florida College of Medicine and Director of the AI for Health Institute. A physician, researcher, and educator, she is internationally recognized for advancing biomedical AI and reimagining how the next generation of clinicians and scientists will train in the AI era.

What's Inside

6 modules covering wide range of AI domains

No coding required

49 video lessons

"Reveal" answers walk you through solutions

Hands-on practice with real biomedical data

Learn with Peers, Guided by Experts

Expert Facilitators

Our AI Expert Coaches guide discussions, foster peer connections, and provide feedback on your assignments. They'll help you apply concepts, answer questions, and make sure you get the most out of each week's learning experience.

Course Community

You'll learn alongside a cohort of healthcare professionals, researchers, and peers who share your interest in biomedical AI. Through discussions, peer reviews, and live calls, you'll build valuable connections, share insights, and support each other's growth throughout the course.

What Others Are Saying

Very pertinent for today's clinicians.

Healthcare professional

The program will help me make better use of AI in my work.

Clinical researcher

This course showed me how AI can support healthcare management tasks I face every day.

Healthcare administrator

With the program, I can already see how patient outcomes will be improved.

Physician participant

Learning Experience

Each module follows the SPACER framework, a cycle of seeing, practicing, sharing, and reflecting that turns concepts into real skills

See

Watch short videos and interactive sessions that introduce AI concepts with real-world biomedical examples.

Practice

Work through guided practices and projects using real datasets, no coding required.

Reflect

Capture your insights in digital journals and tie your learning back to your own research and career.

Share

Connect with peers and AI coaches in live community calls and peer reviews to exchange ideas and feedback.

This approach is based on Kolb's experiential learning theory and adapted for biomedical AI education

After this course, you'll be able to…

Explain and apply the foundations of biomedical AI, including core methods in data, machine learning, imaging, and generative AI, while recognizing opportunities, limitations, and ethical responsibilities.

Design and evaluate biomedical AI experiments that ensure rigor, reproducibility, fairness, and generalizability across diverse populations and healthcare settings.

Practice responsible data stewardship by sourcing, annotating, protecting, and sharing biomedical data ethically and securely across institutions.

Collaborate and communicate effectively in multidisciplinary teams, engaging in mentorship, peer review, and community feedback to advance sustainable AI research.

Translate knowledge into impact by developing and presenting a real-world biomedical AI project that demonstrates innovation, responsibility, and clinical relevance.

How the Program Works

Program Structure and the Three Credential Pathways

One course, three ways to earn credit

AI Passport Fundamentals is a 14-week course of 6 modules and an Impact Project. Every module runs 2 weeks at about 5.5 hours per week and follows the same See–Practice–Share–Reflect rhythm. You complete the same content whichever credit you pursue, only the pass bar changes.

The learning rhythm — **SPACER**

See
7 short videos build the concepts.

Practice
Hands-on practices, no code needed.

Share
Peer feedback and community calls.

Reflect
A journal tying AI to your own work.

What each pathway requires every module

Per module you complete…	**CME** (physicians)	**CEU** (health workforce)	**3-credit** (UF academic)
Reflection journal	Required	Required	Required
Peer feedback (2 peers)	Required	Required	Required
Community call (Week 1 + 2)	Encouraged	Encouraged	Required
7 videos + 2 practices	Encouraged	Encouraged	Required
Impact Project	—	—	Required
Credit earned	11 CME / module	CEU equivalent	3 credit hours

Two things pass every module for most learners: the reflection journal and peer feedback.
Videos and notebooks are there to go deeper, and become required only on the for-credit academic track.

MODULE **01**

Fundamentals of **Biomedical AI Research**

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty Behind Module 1

This module was created by University of Florida faculty across medicine, engineering, and data science. Together they designed the videos, practices, and exercises you'll use to build your AI skills.

Ashish Aggarwal, MS

Guides you through demystifying AI and exploring how biomedical AI projects are designed, from defining clinical problems to building research frameworks.

Benjamin Shickel, PhD

Introduces the fundamentals of artificial intelligence and the AI lifecycle, showing how problems become solutions through data, modeling, and MLOps.

Rhonda Bacher, PhD

Teaches how to design experiments and evaluate models through training, validation, and generalizability, helping you understand what makes results reliable.

Tezcan Ozrazgat-Baslanti, PhD

Explains the principles of scientific rigor and reproducibility, sharing strategies for planning, analyzing, and interpreting studies with confidence.

Yulia Levites Strekalova, PhD

Teaches how to write compelling AI research proposals and deliver effective feedback. Helps learners refine their ideas through collaborative review and scientific communication.

Elizabeth Palmer, PhD

Helps you navigate mentorship and peer review in AI research, offering practical guidance for building ethical, supportive professional relationships.

Module 1

Fundamentals of Biomedical AI Research

Build the vocabulary, experimental-design skills, and ethical grounding to lead rigorous, reproducible, and collaborative biomedical AI research.

2 weeks · 5.5 hrs/week

- Demystifying AI — where it succeeds and fails
- The AI lifecycle, from problem to deployment
- Designing biomedical AI experiments
- Training, validation, and generalizability
- Leveraging multidisciplinary team strengths
- Scientific rigor and reproducibility
- Mentorship and peer review

Hands-on practice:
2 no-code practices

- Demystifying AI Vision
- AI Decision Systems
- Text-to-Insight (clinical NLP)
- Statistical Power Visualizer
- Outlier Detection Explorer
- Moral Machine — ethical dilemmas
- Mentorship & Peer Review Scenarios

Reflection journal:
Your 5 prompts (required to pass)

1. When defining an AI problem in your field, what assumptions or biases might shape your approach?
2. Where in the AI lifecycle do you see your greatest opportunity for growth as a researcher?
3. How would you test whether your work is truly rigorous and reproducible?
4. What ethical dilemmas could arise in applying your AI ideas to real patients or data?
5. How has peer or mentor feedback changed the way you think about responsible AI research?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

MODULE **02**

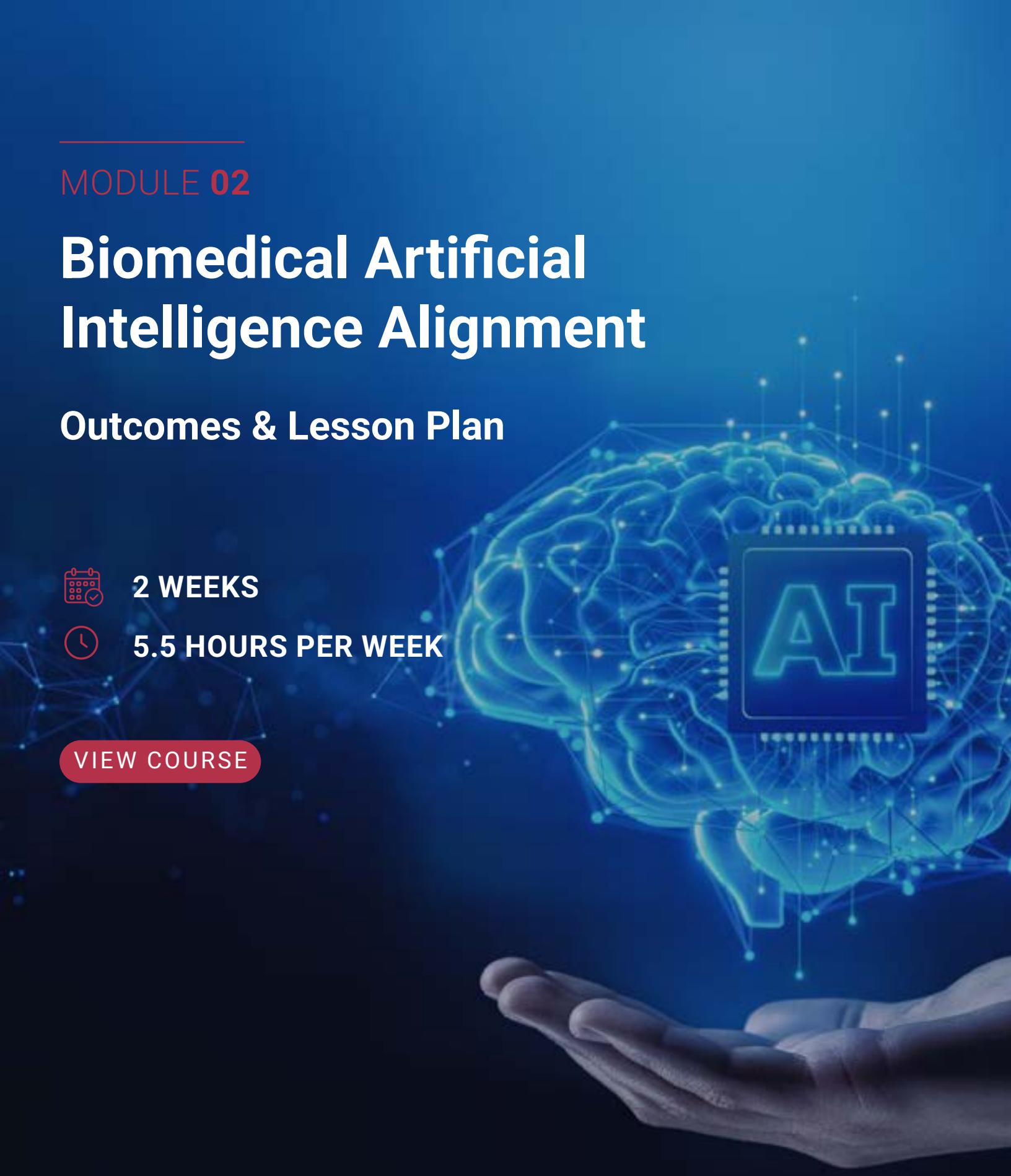
Biomedical Artificial Intelligence Alignment

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE



Meet the Faculty Behind Module 2

This module was created by University of Florida faculty with expertise in medicine, law, engineering, and communication. Learners explore how ethics, fairness, and regulation guide responsible biomedical artificial intelligence.

Elizabeth Palmer, PhD

Helps learners apply core bioethical principles and safety standards to ensure biomedical artificial intelligence is trustworthy, patient-centered, and responsibly designed.

Barbara Evans, JD, LLM, PhD

Equips learners to navigate legal and regulatory frameworks that govern biomedical artificial intelligence, from FDA oversight to liability and ethical compliance.

Jasmine McNealy, PhD, JD

Guides learners in identifying and mitigating bias in biomedical artificial intelligence to support fairness, transparency, and social responsibility.

Tezcan Ozrazgat-Baslanti, PhD

Demonstrates how inclusive data practices can reduce bias and improve the accuracy of biomedical artificial intelligence across diverse populations.

Jeremy Balch, MD

Introduces methods for validating and monitoring biomedical artificial intelligence systems to ensure ongoing safety and clinical reliability.

Module 2

Biomedical Artificial Intelligence Alignment

Explore how ethics, regulation, fairness, privacy, safety, and human–AI collaboration shape trustworthy biomedical AI systems.

2 weeks · 5.5 hrs/week

- The fundamental principles of bioethics
- The regulatory landscape of biomedical AI
- Bias, fairness, and societal impact
- Privacy in biomedical AI
- Biomedical AI quality and safety
- Human–AI collaboration in biomedicine
- Biological variables in AI

Hands-on practice:
2 no-code practices

- Bioethics in Action
- Regulatory Checkpoint
- Bias & Fairness Explorer
- Privacy & Data Protection Lab
- Safety Metrics Lab
- Human–AI Teaming Explorer
- Fairness Analyzer

Reflection journal:
Your 5 prompts (required to pass)

1. How do ethical or regulatory principles shape the way you approach AI in your field?
2. Where might bias or privacy concerns emerge in your own data or models?
3. What does “trustworthy AI” mean in the context of patient care?
4. How can you balance human judgment and AI input in decision-making?
5. What steps could you take to make your AI research or applications safer and more transparent?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

MODULE **03**

Data-Centric Biomedical Artificial Intelligence

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty Behind Module 3

This module was created by University of Florida faculty to strengthen learner fluency in biomedical data quality, ethics, and preprocessing. Through videos, exercises, and peer reflections, learners build trustworthy, high-performance datasets.

Jie Xu, PhD

Helps learners apply core bioethical principles and safety standards to ensure biomedical artificial intelligence is trustworthy, patient-centered, and responsibly designed.

Tyler Loftus, MD, PhD

Explains how to ethically acquire biomedical datasets and navigate complex multi-institutional data sharing. Helps learners address privacy, autonomy, and collaboration through real-world implementation strategies.

Elizabeth Palmer, PhD

Outlines best practices for secure and ethical data use, including deidentification and regulatory compliance. Helps learners strengthen trust in biomedical AI systems through transparent, ethical data handling.

Module 3

Data-Centric Biomedical Artificial Intelligence

Learn how data quality, sourcing, annotation, governance, preprocessing, and secure sharing shape the reliability of biomedical AI.

2 weeks · 5.5 hrs/week

The importance of data for developing biomedical AI

Acquiring ethically sourced biomedical data

Understanding the role of human annotation

Promoting FAIR biomedical data principles

Developing AI/ ML-ready datasets (preprocessing)

Collaborative and secure multi-institutional sharing

Secure and ethical use of biomedical data

Hands-on practice:
2 no-code practices

- Importance of Data for Biomedical AI
- Acquiring Ethically Sourced Data
- Understanding Human Annotation
- Promoting FAIR Data Principles
- Developing AI/ML-Ready Datasets
- Navigating Multi-Institutional Sharing
- Secure & Ethical Use of Data

Reflection journal:
Your 5 prompts (required to pass)

1. How do you decide whether your data are reliable and ethically sourced?
2. What steps can you take to improve data quality and reduce bias in your work?
3. How do you balance patient privacy with the need for open, collaborative data sharing?
4. What would trustworthy data governance look like in your setting?
5. How could you explain your use of biomedical data and AI clearly to patients or collaborators?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

MODULE **04**

Fundamentals of Biomedical Machine Learning (ML)

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty Behind Module 4

This module was created by University of Florida faculty with expertise in statistics, biomedical engineering, and informatics. Through videos and applied activities, learners build and evaluate machine learning models for biomedical use.

Guoshuai Cai, PhD

Teaches fundamental machine learning and deep learning techniques for biomedical data. Helps learners apply classification, regression, clustering, and feature transformation to real-world problems.

Feifei Xiao, PhD

Introduces the shared vocabulary of machine learning and biostatistics, guiding learners through key concepts like supervised learning, unsupervised learning, features, and labels. Helps build a common foundation for cross-disciplinary collaboration.

Li Chen, PhD

Explains how to choose the right biomedical machine learning and deep learning models. Supports learners in selecting appropriate algorithms like decision trees, support vector machines, or neural networks based on task requirements.

Zhe He, PhD

Covers model evaluation metrics such as accuracy, sensitivity, and calibration, and explores the ethical implications of black-box models. Guides learners in using explainability tools like SHapley Additive exPlanations (SHAP) and Local Interpretable Model-agnostic Explanations (LIME) to foster trust in AI systems.

Tezcan Ozrazgat-Baslanti, PhD

Demonstrates how to assess and improve generalizability in biomedical AI. Helps learners identify overfitting, apply cross-validation, and design models that perform reliably across diverse datasets and populations.

Module 4

Fundamentals of Biomedical Machine Learning (ML)

Build and evaluate machine-learning and deep-learning models for biomedical use, from choosing the right model to fairness, generalizability, and explainability.

2 weeks · 5.5 hrs/week

Shared biomedical AI vocabulary

Applied fundamentals of ML and DL

Choosing the right biomedical ML model

Choosing the right biomedical DL model

Evaluating biomedical ML models

Model generalizability

Ethics of black-box algorithms

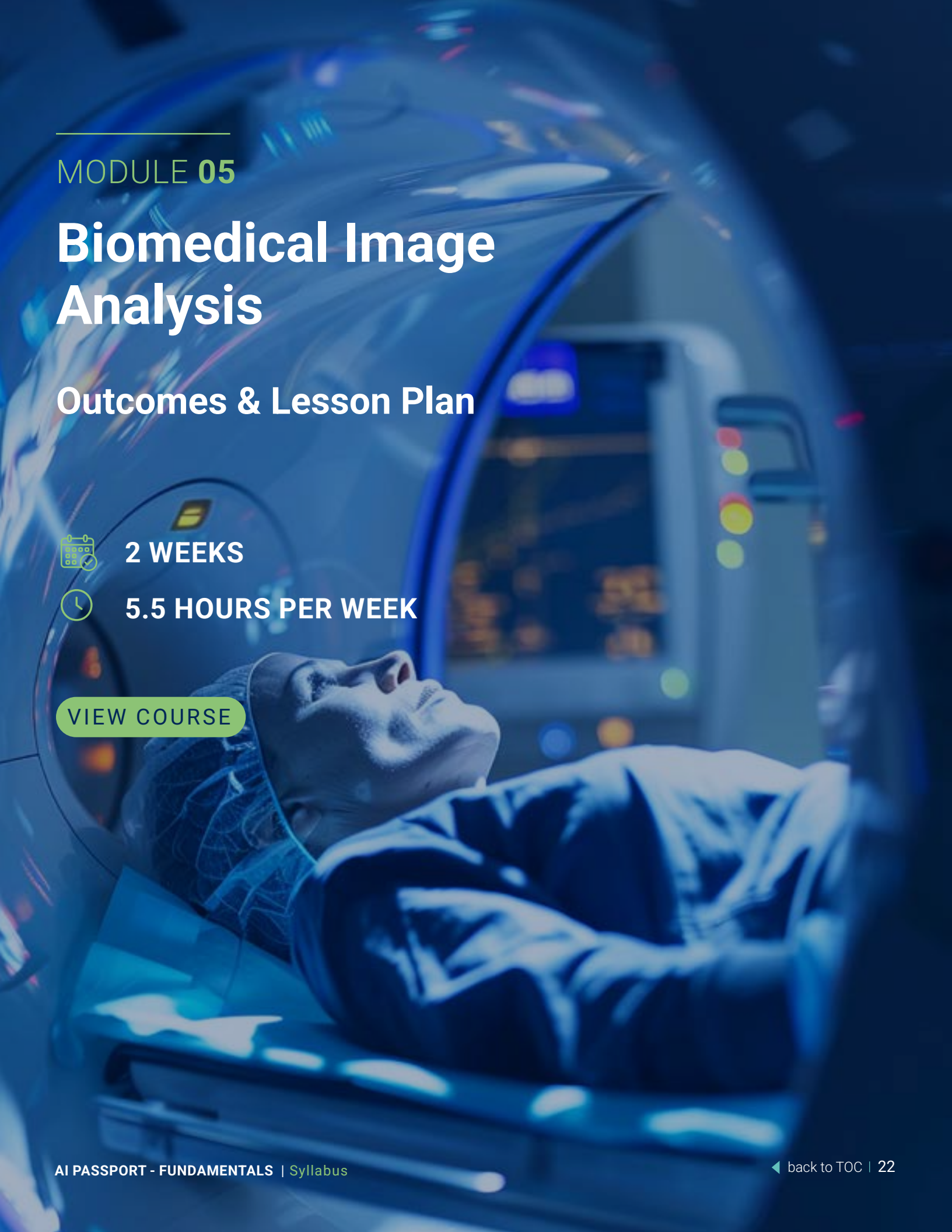
Hands-on practice:
2 no-code practices

- Shared Biomedical AI Vocabulary
- Applied Fundamentals of ML & DL
- Choosing ML Models
- Choosing DL Models
- Evaluating ML Models
- Model Generalizability
- Ethics of Black-Box Algorithms

Reflection journal:
Your 5 prompts (required to pass)

1. How would you choose an AI or ML approach to explore a question in your research or practice?
2. How would you decide whether a simpler or more complex model fits your goals best?
3. How would you test if your model works well across different patient groups or data sources?
4. How would you identify and address potential ethical or fairness concerns in your model?
5. How would you explain your model's insights and limitations to collaborators, clinicians, or patients?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.



MODULE **05**

Biomedical Image Analysis

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty Behind Module 5

This module was created by University of Florida faculty with expertise in statistics, biomedical engineering, and informatics. Through videos and applied activities, learners build and evaluate machine learning models for biomedical use.

Ruogu Fang, PhD

Introduces biomedical imaging modalities and traditional analysis methods, helping learners understand how to extract clinical insights from X-rays, MRIs, and other image types.

Pinaki Sarder, PhD

Explains core preprocessing and advanced image transformation techniques, including data augmentation and multimodal fusion, to improve image quality and prepare data for deep learning.

Ashish Aggarwal, MS

Guides you through demystifying AI and exploring how biomedical AI projects are designed, from defining clinical problems to building research frameworks.

Module 5

Biomedical Image Analysis

Explore biomedical imaging from core modalities and preprocessing to traditional analysis, deep learning, reproducibility, and ethical data handling.

2 weeks · 5.5 hrs/week

- The landscape of biomedical imaging
- Image preprocessing and transformation
- Traditional biomedical image analysis
- Biomedical computer-vision applications
- Advanced and emerging topics (federated & self-supervised)
- Consistency in biomedical image analysis
- Ethical and privacy implications of imaging

Hands-on practice:
2 no-code practices

- Imaging Modalities Explorer
- Preprocessing Lab
- Segmentation & Feature Extraction
- CNN Classifier
- Multimodal Fusion & Model Innovation Lab
- Reproducibility Workflow Builder
- Ethical Data Handling & Secure Sharing

Reflection journal:
Your 5 prompts (required to pass)

1. How would you decide which imaging modality best fits your research or clinical question?
2. How would you use preprocessing or feature extraction to improve image quality in your data?
3. How would you compare traditional image analysis methods with deep learning for your area of work?
4. How would you apply reproducible and ethical workflows when working with biomedical images?
5. How would you balance AI innovation in imaging with the need for patient privacy and data integrity?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

MODULE **06**

Generative AI in Biomedicine

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty Behind Module 6

This module was created by University of Florida faculty with expertise in computer science, engineering, informatics, and medicine. Learners explore how generative artificial intelligence supports biomedical innovation while upholding ethical and reproducible practices.

Ashish Aggarwal, MS

Outlines techniques to evaluate generative AI outputs for consistency and reproducibility. Supports learners in building transparent and reliable workflows.

Benjamin Shickel, PhD

Explains the structure and function of large language models. Guides learners in applying transformer-based models to biomedical natural language processing tasks.

Module 6

Generative AI in Biomedicine

Learn how generative AI and large language models are used in biomedicine, from prompt design to accelerating research, reproducibility, and ethical dissemination.

2 weeks · 5.5 hrs/week

- Fundamentals of generative biomedical AI
- Fundamentals of large language models
- Large language models in biomedicine
- Prompt engineering for biomedical applications
- Utilizing LLMs for accelerating research
- Evaluation and reproducibility of AI-generated data
- Ethical dissemination of generated content

Hands-on practice:
2 no-code practices

- Fundamentals of Generative Biomedical AI
- Fundamentals of Large Language Models
- LLMs in Biomedicine
- Prompt Engineering for Biomedical Applications
- Utilizing LLMs for Accelerating Research
- Evaluation & Reproducibility of AI-Generated Data
- Ethical Dissemination of Generated Content

Reflection journal:
Your 5 prompts (required to pass)

1. How would you use generative AI or large language models to support your research or clinical work?
2. How would you identify where generative AI could be most useful, or most risky, in your field?
3. How would you check whether AI-generated content or results are reliable and reproducible?
4. How would you address ethical issues such as bias, privacy, or misinformation when using generative AI?
5. How would you explain the role and limits of generative AI to your collaborators or patients?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

Impact Project

Outcomes & Lesson Plan

2 WEEKS

5.5 HOURS PER WEEK

VIEW COURSE

Meet the Faculty

This module empowers learners to design, evaluate, and communicate their own biomedical artificial intelligence research project. Through hands-on practice, peer feedback, and faculty guidance, learners practice applying AI methods responsibly and rigorously.

Benjamin Shickel, PhD

Guides learners in designing biomedical artificial intelligence experiments, helping them define research questions, align methods, and evaluate feasibility.

Yulia Levites Strekalova, PhD

Teaches how to write compelling AI research proposals and deliver effective feedback. Helps learners refine their ideas through collaborative review and scientific communication.

Azra Bihorac, MD, MS

Demonstrates strategies for clear and impactful scientific communication. Supports learners in crafting abstracts, presentations, and elevator pitches that resonate with diverse audiences.

Ashish Aggarwal, MS

Explores the intersection of traditional research and biomedical artificial intelligence. Helps learners confidently integrate AI tools into their domain expertise.

Meet the Faculty

This module empowers learners to design, evaluate, and communicate their own biomedical artificial intelligence research project. Through hands-on practice, peer feedback, and faculty guidance, learners practice applying AI methods responsibly and rigorously.

Tezcan Ozrazgat-Baslanti, PhD

Introduces techniques for designing reproducible and trustworthy AI research. Guides learners in documenting data, methods, and models to improve transparency and replicability.

Elizabeth Palmer, PhD

Covers ethical research practices, responsible conduct, and collaboration. Helps learners build a culture of integrity and accountability in biomedical artificial intelligence.

Scott Siegel, PhD

Guides learners in applying modern AI tools and approaches to biomedical and clinical research, with an emphasis on translating emerging AI capabilities into practical solutions.

Impact Project

Finalize your AI Passport project, applying the skills and knowledge learned through the whole course, and present at the project showcase.

Project Showcase: November 18th, 2026

2 weeks · 5.5 hrs/week

- Designing biomedical AI experiments
- Writing successful biomedical AI proposals
- Effective scientific communication
- Bridging traditional research with AI innovation
- Critical evaluation and collaborative peer review
- Robust, reproducible research design
- Responsible conduct of biomedical AI research

Hands-on practice:
2 no-code practices

- Designing Biomedical AI Experiments
- Writing Successful Biomedical AI Proposals
- Effective Scientific Communication
- Bridging Traditional Research with AI
- Peer Review & Feedback Mechanisms
- Robust Biomedical AI Research Design
- Responsible Biomedical AI Research

AI Passport concludes with a project showcase: learners build and finalize an individual or team project, then present at a virtual AI Passport showcase.

Reflection journal:
Your 5 prompts (required to pass)

1. How would you design an AI project to address a key challenge in your own research area?
2. How would you ensure your project is transparent, reproducible, and ethically sound?
3. How would you communicate your project's purpose and impact to collaborators or reviewers?
4. How would you respond if you discovered bias or errors in your AI model or data?
5. How would you apply explainability or privacy-preserving tools, like XAI or federated learning, in your work?

To pass: reflection journal + peer feedback on 2 peers. Full requirements by pathway - page 2.

AI Passport

Begin Your AI Passport Journey

The AI Passport equips the biomedical and clinical research workforce with the skills to thrive in the era of AI. Join a growing community of healthcare professionals and researchers preparing for the future.

Earn a Credly digital badge upon completion

Scan to sign up and join the next cohort