Course Title:

"AI Innovators: Build Smart Apps with MIT App Inventor"

(Grades 9-10 | 4 Weeks | 12 Sessions | Prerequisite: Basic coding familiarity)

Course Outcomes

By the end of this course, students will:

1. Understand **core AI concepts** (ML, NLP, computer vision) through apps.
2. Build **5+ AI-powered apps** using MIT App Inventor's AI extensions.
3. Apply **ethical AI principles** to real-world problems.
4. Develop a **final project** addressing a community need.

Weekly Breakdown

Week 1: Introduction to AI & Simple Apps

Objective: Explore AI basics and build foundational apps.

- **Session 1**: "What is AI?"
  - *Activity*: Demo AI tools (Google Quick Draw, Teachable Machine).
  - *Project*: "AI Quiz App" (Q&A about AI ethics).
- **Session 2**: "Chatbot Buddy"
  - *Skills*: Lists, conditionals, simple NLP.
  - *Project*: Rule-based chatbot (e.g., homework helper).
- **Session 3**: "Voice Assistant"
  - *Skills*: Speech recognition (TextToSpeech/SpeechRecognizer).
  - *Project*: Voice-controlled joke teller.

Assessment: Debug an AI app with missing logic.

Week 2: Machine Learning & Vision

Objective: Train and integrate ML models.

- **Session 4**: "Image Classifier"
    - *Skills*: Personal Image Classifier extension.
    - *Project*: "Emotion Detector" (happy/sad/angry).
- **Session 5**: "Object Identifier"
    - *Skills*: Cloud-based ML (e.g., AWS Rekognition API).
    - *Project*: "Smart Camera" app labeling objects.
- **Session 6**: "AI Art Generator"
    - *Skills*: DALL-E API integration (simplified).
    - *Project*: App that generates art from text prompts.

Assessment: Accuracy test of student-trained classifiers.

Week 3: Advanced AI & Data

Objective: Work with databases and complex AI logic.

- **Session 7**: "AI Tutor"
    - *Skills*: CloudDB, adaptive learning.
    - *Project*: Flashcard app that adjusts difficulty.
- **Session 8**: "Language Translator"
    - *Skills*: Translation API (Google Cloud).
    - *Project*: Text translator with voice input/output.
- **Session 9**: "AI for Social Good"
    - *Skills*: Problem-solving with AI.
    - *Project*: Brainstorm apps (e.g., waste classifier).

Assessment: Peer review of app usability.

Week 4: Final Project & Ethics

Objective: Build a capstone project and discuss AI ethics.

- **Session 10**: "Ethics Workshop"
    - *Activity*: Debate biases in AI (e.g., facial recognition).
- **Session 11-12**: "Build & Present"
    - *Deliverable*: Functional AI app (e.g., mental health chatbot, study assistant).
    - *Presentation*: Demo to class + explain ethical considerations.

Assessment: Rubric for innovation, technical depth, and ethics reflection.

Key Tools & Resources

- **MIT App Inventor AI Extensions**:
    - Personal Image Classifier
    - CloudDB
- **APIs**: Google Cloud Translation, AWS Rekognition (simplified via tutorials).
- **Ethics Materials**: MIT's "AI & Society" case studies.

Adaptations for Younger Learners

- **Simplified APIs**: Use pre-trained models instead of live APIs.
- **Pair Programming**: Team advanced learners with beginners.
- **Unplugged Activities**: Role-play AI decision-making (e.g., "Should a self-driving car prioritize passengers or pedestrians?").

Sample Session Plan (Week 2, Session 4)

Objective: Build an emotion-detection app.

1. **Hook (10 mins)**: Show TikTok filters; discuss how they detect faces.
2. **Direct Instruction (15 mins)**: Train a model with 3 emotions (using MIT's Image Classifier).
3. **Guided Practice (20 mins)**: Build UI with camera + emotion label.
4. **Independent Practice (10 mins)**: Add sound effects for each emotion.
5. **Wrap-up (5 mins)**: Discuss limitations (e.g., accuracy with masks).

Teacher Support

- **Cheat Sheets**: Common errors in AI extensions.
- **Extension Ideas**:
    - Advanced: Integrate ChatGPT API for dynamic chatbots.
    - Creative: AI-generated music apps.