12-Weeks Computer Vision with **Machine Learning Curriculum** formatted for structured planning and mentoring.

It blends theory, coding, projects, and emerging trends—perfect if you want to explore industry, research, or entrepreneurial paths.

This layout supports progress tracking, goal-setting, and weekly reflection.

🎓 Computer Vision Curriculum

Week	Focus Area	Learning Goals	Projects & Practice - Tools & Skills
1	Math & Programming Foundation	Basic math: linear algebra, calculus, probability, Python for ML	Solve vector problems, write NumPy & Matplotlib code
2	Machine Learning Basics	Understand core ML concepts: supervised learning, loss functions, optimization	Train a logistic regressor & decision tree by Scikit-learn
3	Classical Computer Vision	Learn Image filtering, edge detection, histogram equalization, feature descriptors	Build image filters with OpenCV
4	Deep Learning Foundations	Learn backpropagation, activation functions, batch training	Train a simple neural net on MNIST by PyTorch or TensorFlow
5	CNNs for Image Classification	Apply CNNs to an image, Convolutions, pooling, architecture tuning	Build an image classifier with CNN & ResNet, TorchVision
6	Object Detection	Train models to locate objects in images, bounding boxes, anchor boxes	Train YOLOv8 or use pre-trained Faster R-CNN
7	Segmentation Techniques	Pixel-level classification with U-Net, DeepLab, Mask R-CNN	Segment images (medical, satellite)
8	Vision Transformers & Attention	Learn ViT, Swin Transformer, sparse attention	Fine-tune a ViT model for classification
9	Generative & Creative Models	Understand GANs, VAEs, and Diffusion models	Generate images using StyleGAN or Stable Diffusion
10	Multimodal & Captioning Models	Combine images with text for intelligent tasks (CLIP, BLIP, Flamingo)	Build an image captioning or VQA system
11	Deployment & Edge Optimization	Export and optimize models for production, quantize, use ONNX, TensorRT, TFLite	Deploy a mobile-ready detection system
12	Ethics, Explainability, and Portfolios	Explore bias detection, fairness, Grad-CAM, mentorship prep, transparency, career strategies	Create a portfolio and plan next career steps

🧭 Optional Tracks Based on Career Goals

- 💼 **Industry Path**: Focus extra time on deployment, optimization, mobile-ready models
- 🧪 **Research Path**: Spend more time on transformers, self-supervised learning, NeRF
- 🚀 **Startup Path**: Add real-world projects like fashion try-on, smart retail, AR

💡 Extras to Boost Your Journey

- 📚 **Reading List**: CS231n lectures, papers from CVPR/ICCV, ArXiv CV trending models
- 🧪 **Datasets**: COCO, ImageNet, ADE20K, Cityscapes, LFW, CelebA, MNIST
- 🎥 **Courses**: Fast.ai, DeepLearning.ai, Coursera ML & CV specializations
- 🌐 **Communities**: Papers with Code, Hugging Face, CVPR Discords, Reddit r/computervision