# EE482/682: DSP APPLICATIONS

## COURSE INTRODUCTION

http://www.ee.unlv.edu/~b1morris/ee482

# CLASS WEBSITE

- http://www.ee.unlv.edu/~b1morris/ee482

- This will have the most up-to-date information about the class
  - Weekly schedule
  - Tentative dates for exams
  - Homework assignments

- Syllabus – Full course description online

# WEBCAMPUS USAGE

- Gradebook for tracking
- Homework submission
- Exam submission
- Panopto – video lectures, watch before class
- WebEx – in-class discussion, come with questions

- Will need to use some sort of scanning app to convert from handwritten paper to electronic pdf

# INSTRUCTOR

- Dr. Brendan Morris
- Office: SEB 3216
- Office Hours (TBD)
  - MW 15:00-16:00
  - Email for appointments at other times via WebEx/Google Meet
  - Best contact is email brendan.morris@unlv.edu

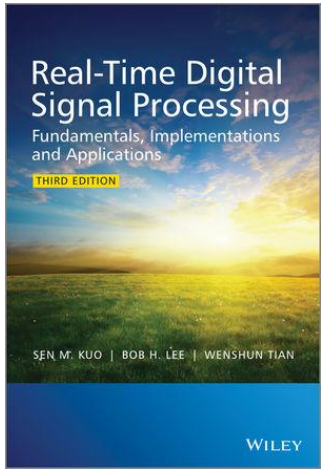
- At UNLV since 2011
- Mostly teach EE courses but research is in Computer Vision (CS area mainly)

# IMPORTANT DATES

- Discussion Lecture (Q&A)
  - MW 16:00-17:15, **Mandatory In-Person**
- Final
  - Mo May 08 18:00-20:00
  - Look up your final exam schedule now to determine conflicts
- Quizzes (5) will be scheduled throughout the semester
  - Open book, open notes

# TEXTBOOKS

- Real-Time Digital Signal Processing: Fundamentals, Implementations, and Applications, 3rd Edition, Kuo, Lee, Tian, 2013. ISBN: 978-1-118-41432-3




- Recommended References
  - Digital Image Processing, 3rd Edition, Gonzalez and Woods, 2008
  - Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools and Techniques to Build Intelligent Systems, 2e, Geron
- See webpage for more resources

# GRADING

- Final: 20%
- Quizzes (5) 25%
- Project 25%
- Homework 30%

- Grading Scale – do not trust Webcampus %
  - Grades follow the typical scale but is curved such that the average grade is around a B-/B
  - The curve can only help you

# HOMEWORK

- One homework assignment approximately every week based on specific topic
  - Will have handwritten and Matlab programming questions
- Homework will be due as indicated on Webcampus. No late homework will be accepted unless prior notification and arrangements are made.
- Student may work together in study groups but all assignments must be completed individually

- Start early
  - Give yourself plenty of time to work through problems completely and get answers to questions before submission
  - Avoid technical glitches → use phone scanning app

# PROGRAMMING

- Course will teach using Matlab (but use not required)
  - Available on campus computers [link]
    - Must have an ACE account
    - http://oit.unlv.edu/accounts/computing-account
  - Student have access online for free
    - https://www.mathworks.com/products/matlab-online.html
  - Many tutorials are available online
    - https://matlabacademy.mathworks.com/
- Recommend free alternatives
  - Octave – open Matlab clone that is good for most basic tasks
  - Python – highly recommended as the way to go now (pair with science libraries such as NumPy, SciPy, Matplotlib)
    - Use virtual environments – Python venv or Anaconda/miniconda

# EXAMS

- Open book, open notes
- Quizzes
  - 5 Short exams given at the end of important modules – every ~3 weeks
- Final
  - Monday 5/8 6-8p
  - Cummulative

# PROJECT

- Open term project to show of an application of DSP
  - You are encouraged to tie this with other projects (e.g. Senior Design or research)
- Grading based on presentation and report
- A pre-proposal is due after Spring Break

# LECTURES AND READING

- Pre-recorded lecture notes will be made available through WebCampus using the Panopto Recordings navigation link
  - Will have captions and text search
- In-class meetings will be recorded through WebEx

- Reading the book actually helps
  - Please come prepared to class having read content
  - Ask questions during the in-class time

# TOPICS

- DSP fundamentals
- Design and implementation of filters
- Frequency domain analysis of signals
  - DFT, FFT, spectral analysis
- Speech signal processing
- Image processing
- Computer Vision – Object Detection

# POLICIES

- As a university student it is your responsibility to conduct yourself ethically and with integrity as described in the Academic misconduct Policy. Cheating and plagiarism will not be tolerated. Any student caught cheating will be given an F grade. (http://studentconduct.unlv.edu/misconduct/policy.html)

# A RESPECTFUL VIRTUAL ENVIRONMENT

- Covid-19 still poses challenges for us all, please let me know if you have any issues
- We are all in this together, let's help one another succeed together
- There are no dumb questions. Only by asking will you get your questions answered
- Everyone is in a different place, we must have a safe environment for participation
- I expect we will all interact respectfully with one another

# TIPS FOR SUCCESS

- **Participate**: Attend discussion session and take part.
- **Practice**: Spend ample time on homework and other problems.
- **Question**: Do not be afraid to ask questions.
- **Network**: Find people taking the same courses as you and build study groups.
- **Review**: Don't just do what is asked in class.
- **Be RESPONSIBLE**: You are an adult and must be responsible for your academic career.

# QUESTIONS?