Spring 2010
# Motion Capture Production, Arts Col 760
5 credits

Prerequisites: graduate standing or permission of instructor
Meeting Times: M, W 3:00pm - 4:48pm
Class Location: 1224 Kinnear, Fishbowl & Motion Capture Lab

Instructor: <name>
Email: <address>
Office Hours: <hours>

## Course Description
A studio-based overview of the motion capture pipeline that includes lab calibration and setup, capturing movement data and creating data driven animation. Students are encouraged to develop their own methods and processes for experimenting with capturing and applying motion.

## Course Learning Goals
- Students will develop an understanding of the history of motion capture and the motion capture pipeline
- Students will develop an understanding of the technology and process of optical motion capture
- Students will learn the skills to direct an effective motion capture session
- Students will learn and apply the software used in capturing and cleaning data, creating skeletons for the data and editing the motion capture data
- Students will be able to apply motion capture data in a way relevant to their field

## Course Methodology
The course will survey important issues surrounding the capture and processing of motion data. Students will learn primarily by studio-based hands-on activities including capturing, cleaning and applying their own data and supplemented by reading and analyzing writing and projects that are centered around motion capture processes.  The class format will be mainly hands-on activities that support course projects and with class discussions about the assigned readings. Examples will be presented in lectures and demonstrations.

## Course Required Readings
There will be a course reading packet required and provided in a course folder on ACCAD's network.

## Grading Criteria
Students must demonstrate satisfactory achievement of course objectives through fulfillment of course projects and by contributing to class discussions. Course projects will require students to use a wide variety of software and equipment at ACCAD to process their motion capture data for use in an animation package. The course grade based on assigned tasks and milestones as listed under **Projects**.  The grade will be based on the level of completion for project goals and the technical and artistic achievement. Collaboration between students in the course is critical to the success of the course since the motion capture process is not a solitary undertaking. Class participation and discussion is expected.

*Attendance:* All students are required to be on time and in attendance for each and every class. Students arriving to class more than 15 minutes late may be counted as absent. Two absences will lower a final grade by 1/3 a letter, three absences will lower a final grade by one letter and four absences will result in failure of the course. You must inform me if you know in advance that you will be late or must leave early from a class.

*Deadlines:* Adherence to deadlines is expected. It is the individual student's responsibility to keep track of deadlines and to present the work to the class and instructor on the specified dates. 15% per day will be

subtracted from late assignments. Technical problems will happen frequently during the semester and students may have trouble accessing the computer lab during "prime time" hours. Students must make their own arrangements for overcoming these difficulties and submitting their work on time. Unless there is a complete system failure in a computer-related course, technical difficulties are never an acceptable excuse for not meeting a deadline. Students should plan their time and work so as to anticipate the technical hurdles that is a part of this profession.

## Projects
*Note: All assignments will be discussed in detail during class sessions.*
Project #1:
Make a proposal for a personal project with a plan for capture session and description of desired data application. Present the proposal as Microsoft Word or HTML document.

Project #2:
Create actor and characterize the subject in Motion Builder using a provided basic Maya skeleton. Blend together two or three takes.

Project #3:
Capture, clean and apply data according to reviewed proposal submitted as part of Project1. Present data application and written documentation of process.

## Project Weighting
Project one:     25%
Project two:     25%
Project three:     50%

## Course Grading Scale
A  = 95 - 100   A-  =  90 - 94
B+ = 87 - 89    B  =  84 - 86   B- = 80 - 85
C+ = 77 - 79    C  =  74 - 76   C- = 70 - 75
D+ = 67 - 69    D  =  64 - 66   E  = 0  - 65


## Topics by week
1. *Topic:*
    Ways of seeing movement in the context of arts applications
    History of Motion Capture Technology.

    *For Review:*
    http://www.wexarts.org/ex/forsythe/
    www.openendedgroup.com
    http://movement.nyu.edu/projects/index.html
    http://labanforanimators.wordpress.com/
    http://cgg-journal.com/2005-3/04/index.htm
    http://www.metacritic.com/games/wii/scores/
    http://thatgamecompany.com/games/
    http://www.strandbeest.com/
    http://www.arthurganson.com/
    http://cgg-journal.com/2005-3/04/index.htm
    http://plantsinmotion.bio.indiana.edu/plantmotion/starthere.html
    http://www.lifesci.sussex.ac.uk/home/George_Mather/Motion/

    *Project 1 Assigned*

    *Readings:*
    McNeill, David. Gesture and Thought. University of Chicago Press, 2007. 22-62

Kitagawa, Midori. <u>Mocap for Artists</u>, Elsevier, 2008. Pp1-11.

2. *Topic:*
Motion capture pipelines; Planning a session.
Using Vicon IQ for initial data cleaning.

*Readings:*
Menache, Alberto. <u>Understanding Motion Capture for Computer Animation and Video Games</u>.
San Francisco, CA: Morgan Kaufman Publishers Inc., 1999. 1-36.

Liverman, Matt. <u>The Animator's Motion Capture Guide</u>. Hingham, Massachusetts: Charles River
Media, Inc., 2004. 21-63.

Kines, Melianthe. "Planning and Directing Motion Capture for Games."
<http://www.gamedeveloper.com/features/20000119/kines_pfv.htm>

<u>Vicon IQ 1.x User Guide.</u> Vicon Motion Systems, 2005. PostProcess-Labelling.pdf,
iQ1.0_PostProcess-Pipeline.pdf,

3. *Topic:*
Motion capture lab setup and calibration.

*Studio Work:*
Capture session for Projects 1, 2.

*Readings:*
Motion Capture Lab Setup. The Ohio State University. 2001-2009.

Vicon Motion Systems. <u>iQ1.0_DataManagement.pdf</u>
Kitagawa, Midori. <u>Mocap for Artists</u>, Elsevier, 2008. 13-28.

4. *Topics:*
Converting positional marker data into joint rotations for human subject capture.
Creating Actor and Character assets. Plotting motion to skeletal hierarchy.

*Reading:*
Autodesk. <u>Motion Builder 2009 User's Guide</u>. 1163-1166, 1081-1094, 1662.

5. *Topics:*
Discussion of proposed captures.
Experimental human and prop capture: potential applications and planning.
Generating 3d form based on motion capture.

*Due: Project 1*

*Reading:*
Vicon Motion Systems. <u>iQ1.0_Modelling.pdf</u>

6. *Studio Work:* Capture sessions for Project 3

7. *Studio Work:* Capture sessions for Project 3

8. *Topics:*

Editing data and plotting multiple takes

*Due: Project 2*

*Reading:*
Autodesk. <u>Motion Builder 2009 User's Guide</u>. 1635-1656.

9. *Topics:*
   Alternative methods of capturing motion through Motion Builder

   *Reading:*
   Autodesk. <u>Motion Builder 2009 User's Guide</u>. 1687-1692.

10. Topics:
    Working with motion capture data in Autodesk Maya.

    Reading:
    Autodesk. Learning Autodesk Maya 2009. Foundation. Autodesk, 2009.

**Course References**
- Kitagawa, Midori, Windsor, Brian. <u>Mocap for Artists. Workflow and Techniques for Motion Capture</u>. Elsevier, 2008.
- Motion Capture Lab Setup Documentation, The Ohio State University, 2001-2009.
- Vicon IQ 1.x User Guide. Vicon Motion Systems, 2005.
- Motion Builder 2009 User Guide. Autodesk, 2009.
- Autodesk. Learning Autodesk Maya 2009. Foundation. Autodesk, 2009.

**Academic Integrity**
Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.
If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Any and all suspected cases of academic dishonesty will be dealt with according to university procedures. Students are referred to the student handbook for further information on academic dishonesty and the

accompanying procedures and penalties.
Additional info http://oaa.osu.edu/coam/home.html


# Accommodations for Students with Disabilities
Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. Please contact the Office for Disability Services at 614-292-3307 in room 150 Pomerene Hall to coordinate reasonable accommodations for students with documented disabilities.

**Personal Safety**
When taking courses and working at ACCAD you should remember that you are member of a community that includes our group as well as the Ohio SuperComputer Center.  As a way of maintaining building security, public spaces at 1224 Kinnear are monitored by video 24 hours/day.  Entry to the building requires that students use their BuckID for access after-hours (5pm – 8am) on weekdays and in all hours of the weekend.  Students should never open any outside entrance door to any person(s) after hours or on weekends.  Students, staff and faculty who are working in the building should be able to access the building with their own BuckIDs.

The University Escort Service operates after 6pm until 3am when classes are in session (i.e. not during quarter breaks and University holidays), and will assist OSU students who live off campus as well as on campus. The University Escort Service can be contacted at 614-292-3322, and scheduled pick-ups are taken in advance.