INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout Part II

Date: 01-08-2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No.   : EA C473 / CS F401
Course Title   : *Multimedia Computing*
Instructor-in-Charge   : *Abhishek Thakur*

Scope and Objective of the Course: The aim of this course is to introduce the concepts of multimedia computing techniques as used for various data streams, multimedia networks, operating systems and architecture. Emphasis will be on both applied and theoretical aspects of multimedia including, algorithms involved and the study of multimedia system design. After successful completion of the course students should be able to apply the concepts and techniques to various problem domains concerned with multimedia based applications and solutions.

Textbooks:
1. Ze-Nian Li & Mark S. Drew, "Fundamentals of Multimedia", Pearson Education, 2004

Reference books
1. Parag Havaldar, Gerard Medioni, "Multimedia Systems: Algorithms, Standards, and Industry Practices", 2010, Course Technology
2. John F. Koegel Buford, "Multimedia Systems", PHI, 2001
3. Steinmetz R & Nahrstedt K, "Multimedia Systems", Springer 2004, (Indian Reprint 2007)
4. Francisco J. Hens, José M. Caballero, "Triple Play Building the converged network for IP, VoIP and IPTV" Wiley, 2008
5. SY Elhabian, KM El-Sayed et. al., "Moving object detection in spatial domain using background removal techniques-state-of-art" http://goo.gl/Tlhqrs 2008 Bentham Science Publishers
6. Yilmaz, Alper, Omar Javed, and Mubarak Shah. "Object tracking: A survey." Acm computing surveys (CSUR) 38.4 (2006): 13.
7. Gary Sullivan et. al., "Overview of the High Efficiency Video Coding (HEVC) Standard", December 2012 (http://goo.gl/SoLBEY and http://goo.gl/6aXHK3).

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
1-2	Introduction to Multimedia	Multimedia: Introduction, Definitions, Applications, Systems	T1: Ch-1
3-4	Multimedia Tools and Applications	Demos and Overview: G-Streamer, VLC, Wireshark, OpenCV, GNU Octave	T1: Ch-2 + class notes

5-6	Graphics and Image data	Graphics and Image Data Representation	T1: 3
7-8	Color and its perception	Intro to Color Science, Color Models in images & video	T1:4
9-10	Video Basics	Fundamental Concepts in Video	T1:5
11-12	Audio Basics	Audio: Fundamentals, Speech Processing and coding	T1:6
13-15	Multimedia Communication	Networking overview, QOS, Multicast, Media on Demand	T1:15,16
16-17	Wireless and Multimedia	Wireless networking basics, Mobility, Synchronization and Error resiliency	T1:17
18-20	Compression Lossless	Lossless Compression	T1:7
21-23	Compression Lossy	Perception based compression	T1:8
24	Multimedia In Action	Demo of SIP/XMPP/SIMPLE	Class notes
25	Image Compression	JPEG Compression tools	T1:9
26	Applied Image Compression	Demo of Various compression and its effects, File formats etc.	T1:3, Class notes
27-29	Video Compression-1	Basic tools for video compression, H261, H263	T1:10,11
30-32	Video Compression-2	MPEG compression, Container Formats	T1:12 + R7
33	Multimedia In Action – Part 2	GStreamer and Related Demo, Mobile Apps, UPnP, DLNA, Miracast	Class Notes
34-36	Audio Compression	ADPCM, Vocoders, Psychoacoustics, MPEG	T1:13,14
37	Media Synchronization	Synchronization across components of multimedia	R3
38-39	Modern Multimedia Systems	CDN/ Hadoop/ YouTube	Lecture Slides + class notes
40-41	Multimedia Research Topics	Object Detection and tracking, Search and Retrieval in multimedia, Augmented Virtual Reality	R5, R6 + Class notes
42	Course Recap	Review of the course	Class Notes

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Test I	60	15	13/9, 2.30--3.30PM	Closed Book
Test II	60	15	21/10, 2.30--3.30PM	Closed book
Assignments	--	21	*	Take Home / Open Book
Project	--	19	*	Take Home / Open Book
Comprehensive	180	30	13/12 AN	

*   - Details of assignments and project will be announced in the class & on course web page.

- 4 Assignments with Viva– best 3 will be considered for final grading.

- Project involves three components - (1) feasibility demo (2) proof of concept demo (3) Complete demo with weightage of 6%, 6% and 7% respectively.

Chamber Consultation Hour: (TBA)

Notices: in CMS

Make-up Policy: Minimum 50% attendance

INSTRUCTOR-IN-CHARGE