

Digital Applications • MIDI 400, Course Review

Week 1 MIDI 400 • Orientation. Review.

MIA handout package as it pertains to MIDI 400 Course outline and course information sheets

- MIDI 400 course rules • Text book orientation and unit summary with reading assignments

Week 2, Unit 1: Dialog, Sound Effects Foley and Music editing

Dialog editing: Source materials. Go through all of the production dialog and see what is usable. Auto conforming from video edit decision list. Source types: analog 1/4 inch, DAT, MDM, Betacam etc. Checkerboarding dialog tracks. Ambience tones and room tones. Sound effects- wild, location, libraries, layering. Sound effects database. Organization of elements and track layouts. Hyper-realism in sound effects. Foley, human created sounds. Footsteps usually first, then specifics. Music recording. Custom versus stock library music. Brought in on DAT, MDM or as files on a DAW.

Week 3 UNIT 2: Digital Audio Storage: Computer Media.

Overview of computer based storage systems • Magnetic hard drive architecture; platter structures, form factors, rotational speeds, actuator arms, read/write heads, block/sector/track structures • Thermal calibration • Head crashes • Hard disk specifications; MTBF ratings, latency, command overhead, access time (average and maximum) • Removable magnetic media; jaz, ORB, zip drives • Removable magnetic media, WORM drives, Magneto-Optical mechanisms, phase-change opticals • Storage systems; duplexing, mirroring, RAID Level 0 through 5 • Data transfer interfaces; IDE, SCSI, SCSI 2, USB, Firewire and other busses.

Week 4 UNIT 3: Digital Audio Storage: Stationary Head ATRs.

Overview of tape based digital audio storage systems; stationary head formats and rotary head formats Magnetic tape bandwidth requirements Digital magnetic tape recording strategies; longitudinal magnetic recording, vertical magnetic recordings and isotropic magnetic recordings Inter-symbol interference Stationary head system design; DASH and Pro-Digi formats DASH recording standards

Week 5 UNIT 4: Digital Audio Storage: Rotary Head ATRs.

Overview of rotary head (video based) digital audio storage systems Video technologies background; NTSC television basics, how a television scans a video frame, video tape recording overview, the helical scan VTR, the NTSC video signal, NTSC, PAL and SECAM television standards • The EIAJ digital audio processor (F1, PCM 501, 601, 701, etc.) • The 1610/1630 format • Digital audio in professional VTR's - Type C (modified), D-1, D-2, D-3, D-5, Digital Betacam and HDTV . ADAT, DA38/78HR/88/98HR.

Week 6 UNIT 5: CD ROM and Other Optical Formats.

Overview of the CD format and the 'Red Book' document Outline the Red, Orange, Yellow, Green, White and Blue Books • The CD ROM format and applications • The CD-I format and applications –audio capabilities • The CD-V format • The CD R format and applications • The CD Eraseable format and applications The CD + MIDI (CD + M and CD + M + G) format and applications • The DVD format and applications • HDCD and SACD audio formats.

Week 7 UNIT 6: Digital Signal Processing I.

Overview DSP applications as used in the audio recording and broadcast industries Basis of digital signal processing -- processing numbers The Mathematical Transform The Fourier Transform • Fast Fourier Transform • Impulse response • Convolution • DSP Operators (Delay, Multiplication and Summation) Errors in DSP systems (Computational errors, Overflow errors, Coefficient errors, and Truncation) FIR digital filters -- design overview and applications • IIR filters -- design overview and applications • Transversal filters -- design overview and applications • Basic design of a digital filter • Basic design of a digital delay • Basic design of a digital reverberator • Sample rate converters • Plug Ins.

Week 8 MIDI 400 • Mid Term Exam

Testing of units 1 through 6

Week 9 MIDI 400 • Mid Term Exam Review.

Take up Mid-Term Exam

Week 10 UNIT 7: Digital Audio Workstations I - Overview.

Overview and historical background of digital workstations and their development (pioneering companies, technological aspects, computer industry influence, etc.) • Overview of differences between PC based and proprietary systems • Overview of workstation architecture • Overview of various workstation subsystems -- storage systems, archive systems, control bus/audio bus, control surface design, mixing functions, filtering functions, synchronization/clocking facilities, AD/DA systems, computer interface design (GUI), etc. • Overview of software applications used in workstations for various industry sectors - recording, music, audio post production, radio and television broadcast, CD pre-mastering, multi-media authoring, etc. DAW External interfaces. Applications and web sites of DAWs.

Week 11 UNIT 8: Digital Audio Workstations II.

Historical overview of various New England Digital audio/music workstations • Overview architecture of the various systems outlining their development • Discuss the impact that the various 'pioneering' NED technologies would have on contemporary digital workstations • Brief outline of NEDs current software products (Edit View and S/Link) • Historical overview of the various AMS Audiofile systems leading into the development of the Logic 1/Logic 2/Logic 3 digital mixers. Overview architecture of the various systems outlining their development Discuss the impact that the various 'pioneering' AMS technologies would have on contemporary digital workstations • Similar review for Fairlight MFX 3 and Merlin.

Week 12 UNIT 9: Digital Audio Workstations III.

Historical overview of Sonic Solutions • Overview the architecture of the Sonic system, outlining their development from Sun to Macintosh computers • Overview the architecture of the current Sonic Solution system (SSP-3 and USP) • Briefly outline current hardware and software products and the various applications that they are targeted at (No-Noise, CD/CD ROM pre-mastering, CMX auto-conform, etc.) • Historical overview of Digidesign • Overview the architecture for Sound Tools II, Pro Tools III system, and Sample Cell II Overview the architecture of the current Pro Tools system (Pro Tools Mix Plus/Pro Tools 5 and digi001/Pro Tools 5 LE) • Outline the Time Domain Multi-plexing system (TDM) and its significance • Briefly outline current hardware (interfaces/cards) and software products and the various applications that they are targeted at (DINR, Master List CD, Post View, important TDM software modules, etc.) Hard drives needed, plug in and mixer latency.

Week 13 UNIT 10: DVD

DVD History and Initial goals • DVD Books • Physical Specifications • DVD features and functionality • MPEG 2 Audio and Video • Aspect ratios • Audio specs for Video • Compatibility

Week 14 Final Exam Review. Review of units 1 through 10

Week 15 MIDI 400 • Final Term Exam Testing of units 1 through 10