

COURSE TITLE	TE142438: Multimedia Communication Network Credits: 2 ELECTIVE COURSE
LEARNING OBJECTIVES	To study various problems encountered in transmission and distribution of multimedia signals over network and related signal processing techniques and coding.
COMPETENCY	The students will understand and be able to solve various problems in communication and distribution of multimedia signals over network, as follows: <ul style="list-style-type: none"> • Coding techniques of image, video and audio for network distribution • Characterisation of transmission media and network and its relation to multimedia signal transmission • Techniques to counter error in transmission, packet loss and effects of traffic fluctuation in network
SUBJECTS	<p>Coding techniques for error resilience: slice structured coding, flexible MB ordering, scalability; data partitioning; flexible reference frame concept. Resynchronisation and error concealment techniques: spatial, temporal & hybrid error concealment. Adaptive architecture: sender, client, proxy and server based. End-to-end delay, reaction time and latency. Complexity. Rate control and transcoding. Scalability modes: temporal, spatial, SNR dan hybrid. MPEG-4 FGS. Motion compensated wavelet video coding. Packet loss model over channel with memory. Streaming over internet. Burst length; heavy tails; underflow; round trip delay; jitter; packet reordering. Packet transmission with priority: packet erasure; layered MDC; CRC+RCPC; error protection; interleaving and product code. Markov chain for wireless channel modeling; memory length. QoS models: InsServ and DiffServ. Bandwidth management, channel quality monitoring; delay differentiation. Middleware adaptation service. Architecture, protocol and file format. Buffering model and leaky bucket: CBR and VBR. Compound streams. Source coding, channel coding and arrival rate.</p> <p>Multicast addressing, multicast router structure; IGMP. Routing in flood & prune mode. Link state routing and MOSPF. Interdomain multicast routing. Multicast principles. Protocols for multicast: DVMRP, PIM, IP and their limitations. QoS. Hierarchical routing: HDVMP, LGC, HIP, QHMRP. Video streaming over P2P network. Sender-driven prioritization; distortion oriented; scheduler evaluation. Experimental examples: CoDiO P2P.</p> <p>Digital video transmission techniques: terrestrial, cable, satellite and IP networks. Network design and coverage.</p>
MAIN REFERENCES	<ul style="list-style-type: none"> • Philip A. Chou & Mihaela van der Schaar, eds., <u>Multimedia over IP and Wireless Networks: Compression, Networking, and Systems</u>, Elsevier, 2007. • Lin Cai, Xuemin Shen & Jon W. Mark, <u>Multimedia Services in Wireless Internet</u>, Wiley, 2009. • Abderrahim Benslimane, ed., <u>Multimedia Multicast on the Internet</u>, ISTE, 2007.
OPTIONAL REFERENCES	<ul style="list-style-type: none"> • IEEE Transaction on Multimedia • IEEE J. on Selected Areas in Communications
PREREQUISITE	-