Institute:	Institute of Technology
Name of Programme:	Master of Computer Application (2-Years Programme)
Course Code:	3MCAD307
Course Title:	Video Processing
Course Type:	Departmental Elective
Year of Introduction:	2021-22

Credit Scheme					
L	T	Practical Component			C
		LPW	PW	W	S	
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Course Learning Outcomes (CLO):

At the end of the course, students will be able to –

1. interpret videos as three-dimensional signal in the spatio-temporal domain
2. explain video quality enhancement techniques and methods
3. analyze various video compression techniques and their applicability
4. design video processing system and compare video processing tool

Syllabus: **Total Teaching hours: 45**

Unit	Syllabus	Teaching hours
Unit-I	**Introduction:** Image definition, image processing, overview of applications, understanding of video, introduction to video processing, 3-D (spatio-temporal) sampling and filtering, motion perception	04
Unit-II	**Motion Detection and Estimation:** Motion detection, 2-d motion estimation, 3-d motion estimation, global motion estimation, block matching, phase correlation, optical flow via regularization, map estimation of dense motion	06
Unit-III	**Video Enhancement and Restoration:** Spatiotemporal noise filtering, coding artefact reduction, super-resolution, scratch/dust removal, intensity flicker correction, scratch removal	08
Unit-IV	**Video Segmentation:** Scene change detection, spatiotemporal change detection, motion segmentation, video object segmentation	07
Unit-V	**Motion Tracking in Video:** Rigid object tracking (2d and 3d), articulated object tracking (2d and 3d)	05
Unit-VI	**Basic Video Coding:** Digital video signals and formats, video compression techniques, transform coding	08
Unit-VII	**Video Compression Standards:** MPEG-1 and MPEG-2, MPEG-4 Visual, H.264/AVC, HEVC, and standard for modern digital video	07
Self-Study:	The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.	

Suggested Readings/ References:	1. Murat Tekalp, Digital Video Processing, Prentice Hall
	2. Alan C. Bovik, The Essential Guide to Video processing, Elsevier Science
	3. Oge Marques, Practical Image & Video Processing using MATLAB
	4. Michael Parker, Suhel Dhanani, Digital Video Processing for Engineers: A Foundation for Embedded Systems Design
	5. Yao Wang, Jorn Ostermann, Ya-Qin Zhang, Video Processing and Communications, Prentice Hall.
	6. David Bull et al, Video Coding for Mobile Communications, Academic Press

| Suggested List of Experiments: | -NA- |

| Suggested Case List: | -NA- |