

**SUMMARY OF INFORMATION ON EACH COURSE**

1.	Name of Course	Computer Vision								
2.	Course Code	TCV3151								
3.	Status of Course [Applies to (cohort) ]	Specialisation Core for B.IT (Hons) Artificial Intelligence								
4.	MQF Level/Stage Note : Certificate – MQF Level 3 Diploma – MQF Level 4 Bachelor – MQF Level 6 Masters – MQF Level 7 Doctoral – MQF Level 8	Bachelor – MQF Level 6								
5.	Version (State the date of the Senate approval – history of previous and current approval date)	Date of previous version : June 2012 Date of current version : June 2014								
6.	Pre-Requisite	TAI2151 Artificial Intelligence Fundamentals								
7.	Name(s) of academic/teaching staff	Tee Connie Lim Kian Ming Ong Lee Yeng								
8.	Semester and Year offered	Trimester 1, Year 3								
9.	Objective of the course in the programme :	To provide a good understanding of concepts, algorithms and their applications in computer vision.								
10.	Justification for including the course in the programme :	Computer vision is a major component for building an artificial intelligence system. This course will provide students with introductory concepts in computer vision. The fundamental techniques in image processing are introduced, followed by the binary vision and image motion algorithms. Students will be able to apply various techniques in image analysis.								
11.	Course Learning Outcomes :	Domain	Level							
	LO1 Know the basic concepts in computer vision	Cognitive	1							
	LO2 Apply the fundamental techniques in image processing	Cognitive	3							
	LO3 Analyse the concept of the binary vision algorithms	Cognitive	4							
12.	LO4 Develop the concept of computer vision in practical applications	Cognitive	5							
	Mapping of Learning Outcomes to Programme Outcomes :									
	Learning Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
	LO1	x						x		
	LO2	x							x	
LO3							x	x	x	
LO4								x	x	

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13.	Assessment Methods and Types :				
	Method and Type	Description/Details		Percentage	
	Mid Term Test	Written Test		20%	
	Assignment	Report and presentation		20%	
	Quiz	Written Test		10%	
	Final Exam	Written Test		50%	
14.	Mapping of assessment components to learning outcomes (LOs)				
	Assessment Components	LO1	LO2	LO3	LO4
	Mid Term Test	25		20	20
	Assignment			20	20
	Quiz	12.5	16.67	10	10
	Final Exam	62.5	83.33	50	50
15.	Details of Course			Mode of Delivery	
	Topics			Lecture	Laboratory
	<b>1. Introduction to Computer Vision</b> Image sampling and reconstruction, Mathematical characterization of images, Image quantization, Camera calibration.			2	2
	<b>2. Digital Image Fundamentals</b> Image processing overview, Applications, Image Enhancement, Image Restoration, Compression, Morphological Processing, Image Sampling and Reconstruction, Image Quantization			4	4
	<b>3. Image Transforms</b> Image superposition and convolution, Discrete transforms, Convolution, Correlation, Image operators.			2	2
	<b>4. Image Enhancement</b> Point Processing, Contrast Stretching, Thresholding, Spatial Filtering, Nonlinear Spatial Filtering, Histogram Processing			4	4
	<b>5. Image Restoration</b> Noise model, Average Filtering, Median Filter, Weight Median Filter, Wiener Filter			2	2
	<b>6. Image Segmentation</b> Region Representation, Hierarchical Representation, Quad Trees, Symbolic Representation, Automatic Thresholding, Edge Detection			2	2
	<b>7. Binary Vision Algorithms</b> Introduction to computer vision, Recursive component labeling, Boundary following algorithm, Thinning algorithms, Binary feature extraction, Region analysis, Spatial moments.			2	2

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	<b>8. Image Motion</b> Dynamic imagery algorithms, Motion correspondence, Image flow, Shape from motion		4	4
	<b>9. Texture</b> Statistical methods of texture analysis, Model based methods, Shape from texture.		2	2
	<b>Total</b>		24	24
16.	<b>Total Student Learning Time (SLT)</b>	<b>Face to Face / Guided Learning</b>	<b>Independent Learning</b>	
	Lecture	24	24	
	Tutorials	-	-	
	Laboratory/Practical	24	12	
	Quiz	-	4	
	Assignment	-	10	
	Mid Term Test	1	4	
	Final Exam	2	20	
	Sub Total	51	74	
	Total SLT		125	
	Credit Value		3	
17.	Reading Materials :			
	<b>Textbooks</b>			
	1. R. Klette (2014). Concise Computer Vision: An Introduction into Theory and Algorithms. Springer.			
	<b>Reference Material (including 'Statutes' for Law)</b>			
	1. E.R. Davies (2012). Computer and Machine Vision, Fourth Edition: Theory, Algorithms, Practicalities. Academic Press.			
	2. D.A. Forsyth & J. Ponce (2014). Computer Vision: A Modern Approach (2nd Edition). Pearson.			
	3. S.J.D. Prince (2012). Computer Vision: Models, Learning, and Inference. Cambridge University Press.			
	4. K. Dawson-Howe (2014). A Practical Introduction to Computer Vision with OpenCV. Wiley.			

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Appendix (to be compiled when submitting the complete syllabus for the programme) :

1. Mission and Vision of the University and Faculty
2. Programme Objectives or Programme Educational Objectives
3. Programme Outcomes (POs)
4. Mapping of POs to the 8 MQF domain
5. Summary of the Bloom's Taxonomy's Domain Coverage in all the Los in the format below :

Subject	Learning Outcomes (please state the learning Outcomes)	Bloom's Taxonomy Domain		
		Affective	Cognitive	Psychomotor
ABC1234	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			
DEF5678	Learning Outcome 1			
	Learning Outcome 2			
	Learning Outcome 3			
	Learning Outcome 4			

6. Summary of LO to PO measurement
7. Measurement and Tabulation of result for LO achievement
8. Measurement Tabulation of result for PO achievement