

		<div>National Institute of Technology Meghalaya</div> <div>An Institute of National Importance</div>											CURRICULUM			
Programme		Master of Computer Applications									Academic Year of Regulation			2024-25		
Department		Computer Science and Engineering									Semester			V		
Course Code	Course Name	Pre-Requisite	Credit Structure				Marks Distribution									
			L	T	P	C	INT	MID	END	Total						
CA605	Image Processing		3	0	0	3	50	50	100	200						
				CO's	Statement					Bloom's Taxonomy						
Course Objectives	To introduce the use of the components of digital image processing fundamentals		Course Outcomes	CA605.1	Able to acquire knowledge about the basic concepts used in Image processing.					Understand						
	To introduce the mathematical foundation related in this domain.			CA605.2	Able to interpret the image processing fundamentals: hardware, software, digitization					Understand						
	To introduce ability to apply image processing techniques in both the spatial and frequency (Fourier) domains.			CA605.3	Able to implement various algorithms for various edge detection, feature detection.					Apply						
	To provide an understanding of description and analysis of how digital images are represented, manipulated, encoded and processed.			CA605.4	Able to describe the importance of image segmentation and restoration.					Analyse						
				CA605.5	Students will be able to understand the Comparison of various Compression methods.					Understand						
	To Provide an understanding with emphasis on algorithm design, implementation and performance evaluation.															
COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CA605.1	2	1		1					2				3		3	
CA605.2	1	1		1					2				2		2	
CA605.3	1	2	3	1	2								2	3	2	
CA605.4		2	3		2	2	3		2			1	2	3	2	
CA605.5		2	3		2	2			2			1	3	3	3	
CA605	1.3	1.6	3	1	2	2	3		2			1	2.4	3	2.4	
SYLLABUS																
No.	Content												Hours	COs		
I	Introduction Background, definition, Origin of DIP, Digital image representation, fundamental steps in image processing, elements of digital image processing systems, image acquisition, storage, processing, communication and display, effect of Aliasing and Jaggles, Advantages of high resolution systems DDA line algorithms: Bresenhams line and circle derivations and algorithms. Metric and topological properties of Digital Images, Histogram, entropy, Visual Perception, Image Quality, image smoothing, Edge detectors and quantification measures												08	CA605.1, CA605.2		
II	Segmentation: Threshold detection methods, Optimal Thresholding, Edge based Segmentation-Edge image thresholding, Edge relaxation, Border tracing, Hough Transforms, Region based segmentation: Region Splitting, Splitting and Merging, Watershed Segmentation.												08	CA605.2, CA605.3		
III	Image Enhancement in the spatial domain: Basic gray level transformations, histogram processing, Enhancement using arithmetic/logic operations, Basics of spatial filtering-comparison between smoothing and sharpening spatial filters. Image Enhancement in the frequency domain: 1D Fourier transform-2D Fourier transform and its Inverse-Smoothing & sharpening frequency domain filters (Ideal, Butterworth, Gaussian)-homomorphic filtering.												10	CA605.2, CA605.3		
IV	Mathematical Morphology: Basic Mathematical Concepts, Binary dilation and Erosion, Opening and closing, Gray Scale dilation and erosion, Skeleton, Thinning , Thickening Ultimate erosion, Geodesic transformations, Morphology and reconstruction, Morphological Segmentation												08	CA605.3, CA605.4		

V	Cyber Image Analysis: Image Forgery, Types of image forgery, different tampering methods, detection and classification of image forgery	08	CA605.4, CA605.5
Total Hours		42	
Essential Readings			
1. Imran Bashir, “Mastering Blockchain: A deep dive into distributed ledgers, consensus protocols, smart contracts, DApps, cryptocurrencies, Ethereum, and more”, 3rd Edition, Packt Publishing, 2020, ISBN: 9781839213199, book website: https://www.packtpub.com/product/mastering-blockchain-third-edition/9781839213199			
2. Imran Bashir, “Mastering Blockchain”, 1st Edition, Packt, 2017.			
3. Melanie Swan, “Blockchain: Blueprint for New Economy”, 1st Edition, O'Reilly Media, 2015.			
4. Sam Goundar, “Blockchain Technologies, Applications And Cryptocurrencies: Current Practice And Future Trends”, 1st Edition Word Scientific, 2020			
Supplementary Readings			
1. Hyperledger Tutorials - https://www.hyperledger.org/use/tutorials			
2. Ethereum Development Resources - https://ethereum.org/en/developers			
3. Alan T. Norman, “Blockchain Technology Explained: The Ultimate Beginner’s Guide About Blockchain Wallet, Mining, Bitcoin, Ethereum, Litecoin, Zcash, Monero, Ripple, Dash, IOTA and Smart Contracts”, 1st Edition, 2017			
4. Jan Veuger, “Blockchain Technology and Applications”, 1st Edition, Nova Publisher, 2019			
5. Andreas Bolting, “Cryptographic Primitives in Blockchain Technology : A Mathematical Introduction”, 1st Edition, Oxford University Press, 2020.			