UNIVERSITI TEKNOLOGI MARA

CSC733: IMAGE PROCESSING

Course Name (English)	IMAGE PROCESSING APPROVED
Course Code	CSC733
MQF Credit	3
Course Description	This course is intended to acquaint students with the fundamental understanding of image processing, its most common image processing techniques and its mathematical foundations. It is structured to enable students to understand the underlying principles of digital image formation and related technical aspects, image enhancement, compression, and their applications in various industrial areas. Upon completion of the course, the student should be competent in applying the concepts in an image processing project, and should be capable of pursuing research in image processing areas.
Transferable Skills	Real life mini project
Teaching Methodologies	Lectures, Lab Work, Studio, Demonstrations, Case Study, Journal/Article Critique
CLO	CLO1 Explain the basic theories and concepts of image processing. CLO2 Demonstrate basic image processing techniques to improve or restore image appearance. CLO3 Apply proper techniques of image enhancement, restoration, compression and segmentation to solve real-life applications. CLO4 Evaluate image processing problems and select solutions
Pre-Requisite Courses	No course recommendations

Topics
1. Image fundamentals, representations and properties 1.1) Fundamental issues of image processing 1.2) Applications for image processing 1.3) Components of image processing system 1.4) Image acquisition 1.5) Spatial and Fourier domain 1.6) Image sampling and quantization
2. Spatial and Frequency Image Enhancement 2.1) Graylevel transformation 2.2) Histogram Processing 2.3) Logical and arithmetic operations 2.4) Image filtering: average, median, min, max 2.5) Image sharpening
3. Binary and Graylevel Mathematical Morphology 3.1) Dilation and erosions 3.2) Opening and closing 3.3) Morphological reconstruction
4. Image Segmentation 4.1) Global and adaptive thresholding 4.2) Similarity segmentation 4.3) Discontinuity segmentation 4.4) Colour image segmentation
5. Feature Extraction 5.1) Shape descriptors 5.2) Colour descriptors 5.3) Texture descriptors

6. Image understanding and Analysis
6.1) Object recognition
6.2) Object tracking

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Lab Exercise	At least 3 lab assignments	20%	CLO1 , CLO2 , CLO3
Presentation	Project progress and final presentation	20%	CLO1 , CLO2 , CLO3
Test	Minimum two tests	20%	CLO1 , CLO2 , CLO3

Reading List

Recommended Text

- **Nursuriati Jamil and Khalil Awang 2014, *Practical Digital Image Processing with MATLAB*, UiTM Press [ISBN: 978-967363028]**

Reference Book Resources

- **Gonzales, R.C. and Woods, 2011, *Digital Image Processing*, Prentice Hall [ISBN: 78-0131687288]**
- **Sonka, M, Hlavac V and Boyle 2010, *Image Processing, Analysis, and Machine Vision* [ISBN: 978-049508252]**
- **William K. Pratt 2011, *Digital Image Processing*, Wiley-Interscience [ISBN: 0-471-37407-5]**
- **Maria Petrou,Panagiota Bosdogianni 2013, *Image Processing*, Wiley [ISBN: 0471998834]**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources