Subject Description Form

Subject Code	HTI5720
Subject Title	Digital Imaging and PACS
Credit Value	3
Level	5
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	To pursue in students the advanced knowledge of digital image processing, PACS and related workflow in clinical practice and research.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. appraise the benefits and latest developments of digital imaging and PACS b. review the use of digital imaging technology in clinical practice c. evaluate the existing methods for analyzing and visualizing digital images d. perform the role of a PACS administrator e. demonstrate awareness of security issues in digital imaging and PACS, and f. apply image informatics in research

Subject Synopsis/ Indicative Syllabus	**Part I: Image processing, analysis and visualisation**
	1. Advanced digital imaging technology
	    1.1 Latest signal and image processing technology
	    1.2 Clinical applications
	2. Digital image analysis and visualization
	    2.1 Statistical image analysis methods
	    2.2 Advanced image segmentation methods
	    2.3 Models for image visualization
	    2.4 Limitations of image visualization
	
	Part II: Picture Archiving and Communication System
	3. PACS for imaging manager and administrators
	    3.1 Streamlined workflow integration
	    3.2 Requirements of system architecture
	    3.3 Connectivity issues
	    3.4 Image compression: wavelet conversion, JPEG, JPEG2000 - considerations for local and teleradiology communications
	    3.5 Security and ethical issues, e.g. encryption & decryption
	    3.6 Considerations for PACS purchase
	        3.6.1 Trend of electronic storage technology
	        3.6.2 Choice of display workstations
	    3.7 Legal considerations in operating PACS, networking, workstations
	    3.8 Management of medical image information system & network
	4. PACS-based imaging applications and research

Teaching/Learning Methodology	Lectures will be used to introduce the subject materials, which will be elaborated in tutorials and practical sessions.

Assessment Methods in Alignment with Intended Learning Outcomes								
	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
			a	b	c	d	e	f
	1. Written assignment	40%	√	√		√	√	
	2. Written test	40%	√		√		√	
	3. Experimental tasks	20%		√		√	√	√
	Total	100 %						

Experimental tasks allow the students to demonstrate their abilities to apply the image processing techniques and PACS workflow integration skill to clinical practice and research.

Written assignment and test allow the students to show their understanding of informatics concept, basic theory and principle of digital image processing and the role of PACS administrator.

Student Study Effort Expected

Class contact:	
▪ Lecture	15 Hrs.
▪ Tutorial	12 Hrs.
▪ Practical	12 Hrs.
Other student study effort:	
▪ Self-study	65 Hrs.
Total student study effort	104 Hrs.

Reading List and References

Reading Materials:
1. Liu Y. 2011. PACS and digital medicine: essential principles and modern practice. Boca Raton, FL: CRC Press.
2. Blanchet G, Charbit M. 2014. Digital signal and image processing using Matlab. London: ISTE Ltd.
3. Huang H.K. 2010. PACS and imaging informatics: basic principles and applications. New York: Wiley.
4. Jan J. 2006. Medical image processing, reconstruction, and restoration: concepts and methods. Boca Raton, Fla.: Taylor & Francis.
5. Najarian K, Splinter R. 2012. Biomedical Signal and Image Processing. Boca Raton: CRC Press.
6. Kalender W.A. 2011. Computed Tomography: Fundamentals, System Technology, Image Quality, Applications. Erlangen: Publicis.

Journals:
• British Journal of Digital Imaging
• Journal of Digital Imaging
• Computerized Medical Imaging and Graphics
• Radiologic Technology