# ELEN90076 Digital Image Processing

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| **Credit Points:** | 12.5 |
| **Level:** | 9 (Graduate/Postgraduate) |
| **Dates & Locations:** | 2015, Parkville<br>This subject commences in the following study period/s:<br>Semester 2, Parkville - Taught on campus. |
| **Time Commitment:** | Contact Hours: 36 hours of lectures and tutorials Total Time Commitment: 200 hours |
| **Prerequisites:** | Enrolment in a research higher degree (Masters or PhD) in Engineering |
| **Corequisites:** | None |
| **Recommended Background Knowledge:** | Students will be expected to be familiar with statistics and probability. |
| **Non Allowed Subjects:** | None |
| **Core Participation Requirements:** | For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: <a href="http://services.unimelb.edu.au/disability">http://services.unimelb.edu.au/disability</a> |
| **Coordinator:** | Dr Karim Seghouane |
| **Contact:** | **Melbourne School of Engineering**<br>Ground Floor, Old Engineering (Building 173)<br>Current students:<br>Email: **13MELB@unimelb.edu.au (mailto:13MELB@unimelb.edu.au)**<br>Phone: 13MELB (13 6352)<br>+61 3 9035 5511 |
| **Subject Overview:** | Images and visual information are integral parts of our daily lives. Digital image processing plays an important role in various practical applications among them: television, medical imaging modalities such as X-ray or ultrasound, photography, security, astronomy and remote sensing. This subject will introduce the fundamentals of image processing and manipulation. While image applications will be used for illustrations, the subject emphasizes general principles of image processing rather than specific applications. It is expected to cover the following topics: introduction to digital image processing, image acquisition and display, image perception, colour representations, image sampling, quantization and image quality measurement, point operations, linear image filtering and correlation, image transforms and sub-band decompositions, contrast and colour enhancement, eigenimages, image segmentation, image restoration and image compression. |
| **Learning Outcomes:** | Upon completing this subject, the student is expected to:<br>1- describe the principles of image formation, acquisition and perception<br>2- describe the theory and algorithms that are widely used in digital image processing<br>3- demonstrate a general knowledge on current technologies and issues that are specific to image processing systems<br>4- develop hands-on experience in using computers to process images |

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| | 5- define image operations and use the MATLAB Image Processing Toolbox to execute these image operations<br>6- demonstrate critical thinking about shortcomings of the state of the art in image processing |
| **Assessment:** | Applied research project will be carried out from week 4 to 11. The students will be divided in groups of two and each research project will require a written assignment per group (worth 20%), a Matlab demonstration (worth 10%) and a presentation to the class (worth 10%). (Approximately 55-60 hours of work per student). ILOs 1-6 are addressed in these workshops. One written three-hours end-of-semester examination (in the examination period)(60%). The examination is a hurdle and must be passed to pass the subject. ILOs 1-6 are addressed in the exam. |
| **Prescribed Texts:** | None |
| **Breadth Options:** | This subject is not available as a breadth subject. |
| **Fees Information:** | Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees |
| **Generic Skills:** | Ability to apply knowledge of science and engineering principles to image and video related problems<br>Ability to undertake image and video problem identification and formulate solutions<br>Capacity for independent critical thought, rational inquiry and self-directed learning<br>Develop work collaboration and communication skills. |
| **Related Course(s):** | Master of Philosophy - Engineering<br>Ph.D.- Engineering |