CHEN90027 Carbon Capture and Storage

Credit Points:	12.50
Level:	9 (Graduate/Postgraduate)
Dates & Locations:	2012, Parkville This subject commences in the following study period/s: Semester 1, Parkville - Taught on campus.
Time Commitment:	Contact Hours: 3 x one hour lectures + 1 x one hour tutorial per week + 1 x six hours of laboratory work per semester Total Time Commitment: Estimated 120 hours
Prerequisites:	Students must have completed the following subjects prior to enrolling in this subject: **CHEN30001 Reactor Engineering (../../view/2012/CHEN30001)** (Prior to 2010 CHEN40003 Reactor Engineering) **CHEN30005 Heat and Mass Transport Processes (../../view/2012/CHEN30005)**
Corequisites:	None
Recommended Background Knowledge:	None
Non Allowed Subjects:	None
Core Participation Requirements:	For the purposes of considering applications for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005) and Students Experiencing Academic Disadvantage Policy, this subject requires all students to actively and safely participate in laboratory activities. Students who feel their disability may impact upon their participation are encouraged to discuss this with the Subject Co-ordinator and the Disability Liaison Unit http://www.services.unimelb.edu.au/disability/
Coordinator:	Dr Colin Scholes
Contact:	Email: **cascho@unimelb.edu.au (mailto:cascho@unimelb.edu.au)**
Subject Overview:	This subject will give an overview of the drivers for carbon capture and storage, the technology and the economics. Specific topics will include: # Climate Change and Emissions Reduction Measures # Fuel types (coal, oil, gas). Coal chemistry # Other emission sources (natural gas sweetening, cement, iron and steel production) # Combustion – conventional pulverized coal, supercritical boilers, IGCC and gasifier design, oxyfuel processes # Coal to liquid fuel processes # Carbon capture using solvent absorption. Other technologies including membranes, adsorbents, chemical looping, cryogenics and gas hydrate technology # Carbon dioxide compression and pipeline transport # Geological Storage – Site selection (containment, capacity, injectivity). Reservoir modeling (static and dynamic), storage in coal seams, enhanced coal bed methane recovery, storage in depleted gas reservoirs and saline formations, enhanced oil recovery. Long term closure and remediation # Economics – levelised cost of electricity, carbon accounting, the economics of CCS # Health and Safety, Risk Assessment and management, legal issues
Objectives:	On completion of this subject students should be able to: # Discuss the impacts of climate change and the range of measures that can be taken to reduce emissions # Describe the operation of a coal fired power station and the integration of carbon capture and storage into this operation

	# Estimate the cost of carbon capture and storage and its impact on the levelised cost of electricity
Assessment:	Laboratory-based assignment (10%)Computer-based assignment (10%)End of Semester examination (80%)
Prescribed Texts:	Carbon Capture and Storage, Stephen A. Rackley, Elsevier 2010
Recommended 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:	On completion of this subject students should be able to demonstrate an: # In-depth technical competence in at least one engineering discipline; # Ability to use a systems approach to design and operational performance. # Understanding of the social, cultural, global and environmental responsibilities of the professional engineer and the need for sustainable development # Understanding of the principles of sustainable design and development
Related Majors/Minors/ Specialisations:	Master of Engineering (Biomolecular) Master of Engineering (Chemical)