UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

WT4504

Lecture 0-0

Building Services I

Syllabus

UNIVERSITY of LIMERICK
OLLSCOIL LUIMNIGH

Course Motto

“I hear and I forget

I see and I remember

I do and I understand”

Ben Franklin

WT4504 Building Services I

- **Lecturer:** **Dr. Colm Cryan**
- **Room:** **SR2013**
- **email:** **colm.cryan@ul.ie**

- **Successful students will come to class with assignments already attempted**

Course Structure

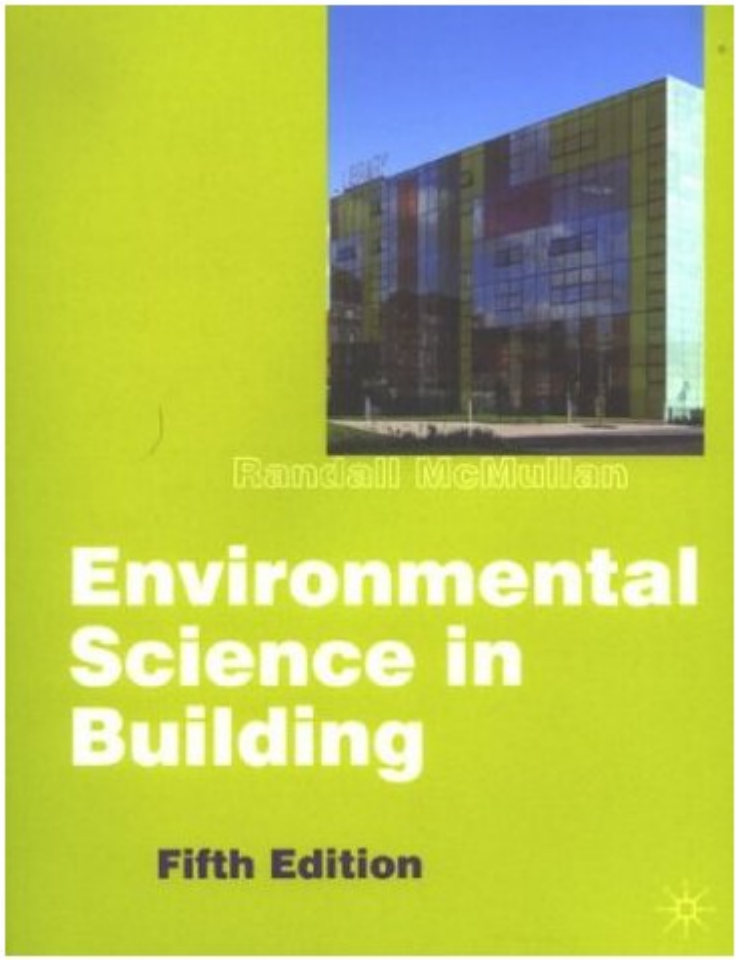
- **Part 1-1: Building Services and Energy**
  - **Weeks 1 through 6**
  - **WT4504: Civil Engineering (CE)**
  - **WT4504: Construction Management and Engineering (CME)**

- **Part 1-2: Building Services and Water**
  - **Weeks 7 through 12**
  - **WT4504: Construction Management and Engineering**

Recommended Text Book

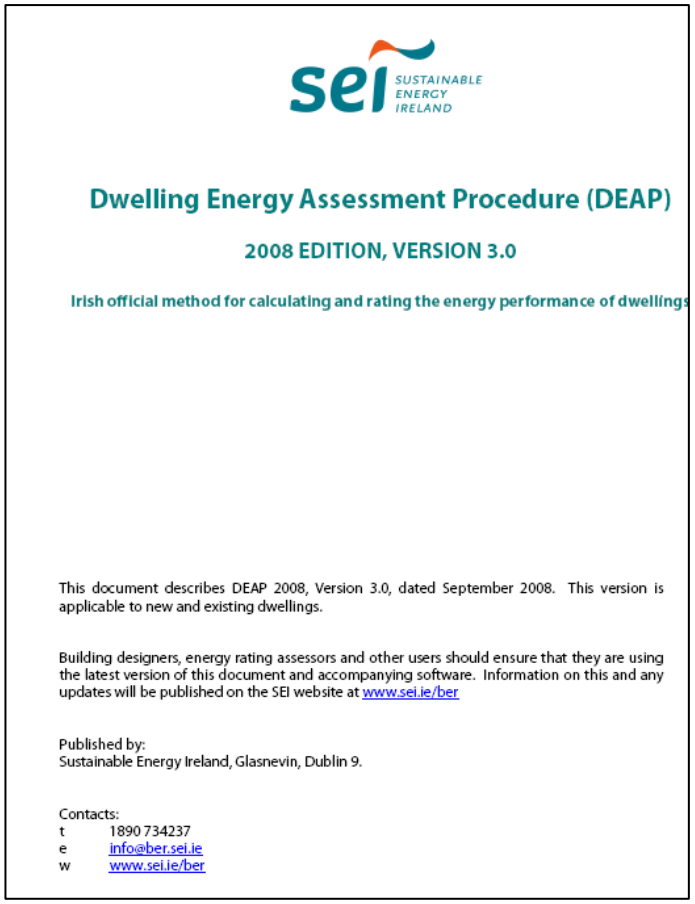
- McMullan, R. (2001) Environmental Science in Building 5th Edition. Londor UK: MacMillan

- Examinable material
  - Recommended text book
  - My Sulis Notes
  - My Class notes
  - Posted DEAP manual
  - Project reading



Required Reading

- **Dwelling Energy Assessment Procedure (DEAP)**
- **2008 EDITION, VERSION 3.0**
- **Irish official method for calculating and rating the energy performance of dwellings**
- **Provided on SULIS**



sei SUSTAINABLE ENERGY IRELAND

Dwelling Energy Assessment Procedure (DEAP)

2008 EDITION, VERSION 3.0

Irish official method for calculating and rating the energy performance of dwellings

This document describes DEAP 2008, Version 3.0, dated September 2008. This version is applicable to new and existing dwellings.

Building designers, energy rating assessors and other users should ensure that they are using the latest version of this document and accompanying software. Information on this and any updates will be published on the SEI website at www.sei.ie/ber

Published by:
Sustainable Energy Ireland, Glasnevin, Dublin 9.

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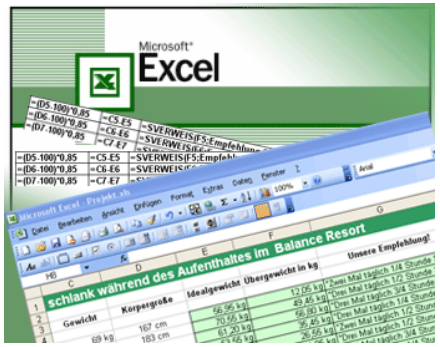
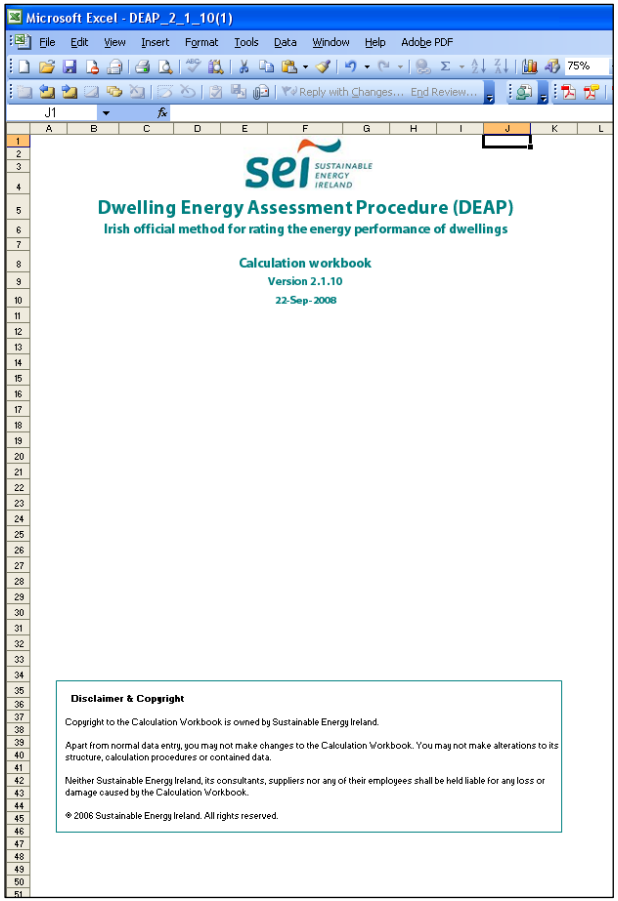
w www.sei.ie/ber

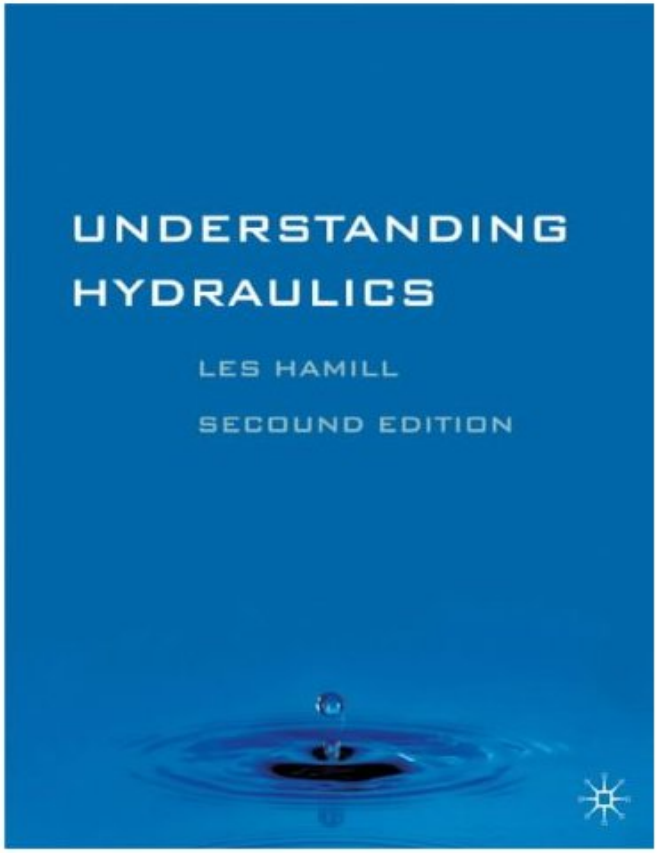
Required Software

- You will need computer access
- You need to know how to use excel
- DEAP program will be provided via Sulis





Supplementary Text Book (Part 2 Only)



- Hamill, L. (2001)
- Understanding Hydraulics, 2nd edition, Palgrave, Basingstoke; ISBN 0333779061
- Some in Library
- I have informed book store and publisher
- Only those taking module WT4504

Additional Reading:

- **Vaughn Bradshaw, (2006) The Building Environment, John Wiley & Sons Inc.**
- **Building Regulations 1997, Technical Guidance Documents A – M *(see public folder)***
- **Hall, F & Greeno, R. (2003) Building Services Handbook 2nd Edition Oxford, UK: Elsevier Butterworth-Heinemann**
- **Chadderton, D. (2004) Building Services Engineering 4th Edition London, UK: Spoon Press**

Aims

- This course aims to teach about;
  - Importance of Services to People
  - Systems (Holistic) Thinking
  - Assessment Techniques
  - WT4504 Building Services 1-1 Energy
  - WT4504 Building Services 1-2 Water
  - WT4208 Building Services 2-1 CfSH
  - WT4208 Building Services 2-2 Electricity
  - WT4208 Building Services 2-3 Light
  - WT4208 Building Services 2-4 Sound

- Students should understand at a system level how to deliver Sustainable Building Services to their Projects

Lecturer Bias

- **Qualifications**
  - **BSc (honours) Physics**
  - **MEng Material Processing**
  - **PhD Optical Communications**

- **Project Management Experience**
  - **Deployment of ICT Infrastructure**
  - **Test facility Design, Build and Operation**
  - **Sustainability in Built Environment**
  - **Refurbishment of Heritage Buildings**
  - **Commercial Management**
  - **15 working in United States of America**
  - **Building Physics**

Academic Honesty

- The MST Deparetment adheres to the strictest standards of academic honesty. An important aspect of achieving these standards is to be sure that students are aware of faculty expectations regarding academic honesty. This statement is an attempt to clarify these expectations as they apply to this course.
- Projects and Quizzes
  - Projects and Quizzes performed by students for submission serve the following two purposes:
    - Are seen as educational devices to help students master the course material. This includes the concepts, theories, methodologies, and tools presented in class and recitation as well as such skills as working in teams.
    - Help the faculty evaluate how well each student has mastered the course material
  - Thus, policies regarding academic honesty are intended to balance these two purposes and, unless otherwise stated, apply to all assignments
  - Students taking this class can work together to conceptualize general approaches to assignments. However, unless otherwise specified for a particular assignment, the work you submit must be done completely on your own. This includes text, numerical calculations, mathematical derivations, diagrams, graphs, computer programs and output. You are also expected to properly reference the source of any information used in a submission that is not your own. This includes any book, article, Web page, presentation or personal correspondence that you used for your work.
  - It is also inappropriate to use assignments, problem sets or projects submitted in previous years as a source, unless otherwise indicated.
- If you have any questions about how these policies relate to a specific situation, please speak to the teaching staff of this course for clarification

Assessment

- **Part 1 Energy**
  - **10% Marks Continual Assessment Pop Quizzes**
  - **30% Project Work**
  - **60% Semester Examination**
    - **Three (3) questions,**
    - **Answer all three (3)**
    - **One and half (1.5) hours**

- **Part 2 Water**
  - **10% Marks Continual Assessment Pop Quizzes**
  - **90% Semester Examination**
    - **Three (3) questions,**
    - **Answer all three (3)**
    - **One (1.0) hour additional (same paper)**
- **Three hour for exam for CME one paper both halves**
- **One and half hour exam for CE students same paper first half**

Repeats

- **Project work result carried forward and cannot be repeated**
- **Continual Assessment result carried forward and cannot be repeated**
- **Repeat exams follow the same pattern as initial exam**

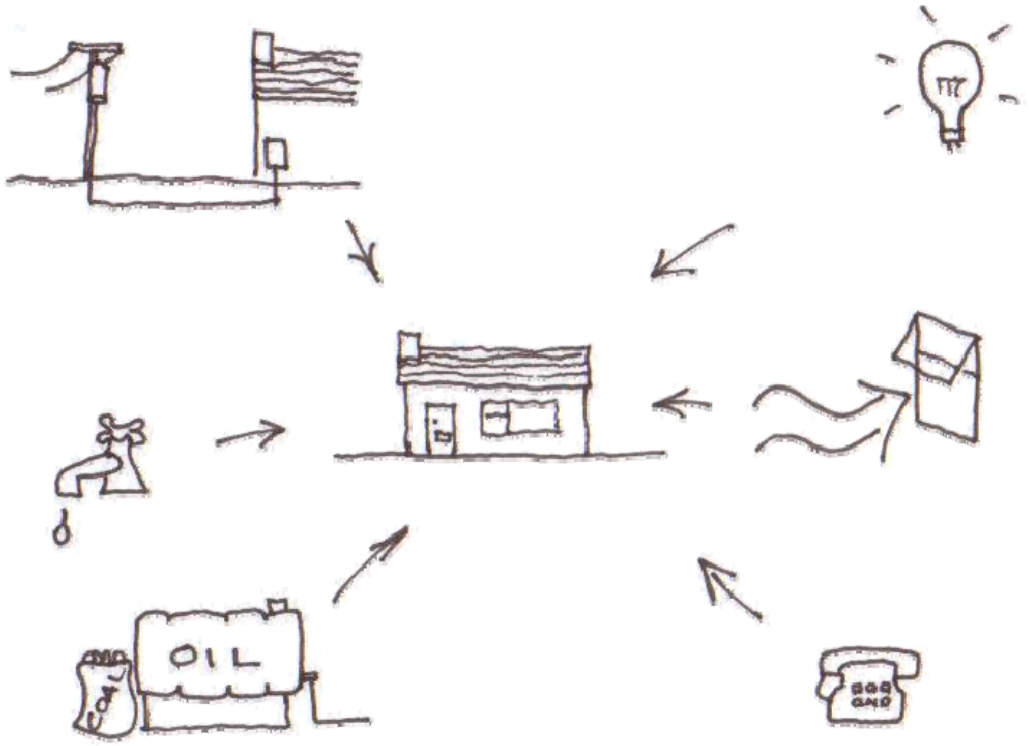
Exam Advice

- **Every aspect of must be considered**
- **It is unlikely that a student that fails to attend the weekly class will pass the course**
- **You should bring a scientific calculator to the exam**
- **Aide Memoir will not be permitted**
  - **Students can NOT bring any written material into the exam**

Overview

- **Introduction**
  - **Understanding Nature and the Environment**
  - **The links between the Natural and built Environment**
  - **Terms and Definitions**

- **Principals**
  - **Part 1: Energy**
    - **Heat**
    - **Ventilation**
    - **DEAP**
  - **Part 2: Water**
    - **Potable**
    - **Waste**



Part 1: Energy

- Principals of Energy and power
  - Properties
  - Energy flow
  - Measurement
- Properties of Materials
  - Insulation
  - Conductivity
- Building Location and Design
- Building Elements
  - Walls
  - Floors
  - Roof
  - Windows
- Sources of Energy
- The energy balance equation

- Principals of ventilation
  - Passive
  - Mechanical
  - measurement
- Need for ventilation
- Calculation of ventilation rates
- Condensation and ventilation
- Heat pump
  - Heaters and refrigerators

Part 2: Water

- Principals of Fluids
  - Types of Fluids
  - Pressure, Force, Momentum
  - Measurement
  - Terms
- Hydrological Cycle
- Hydrostatics
  - Containment
  - Buoyancy
- Continuity of Mass & fluid flow
- Force and Momentum changes
  - Flow around corners
  - Flow through pipe diameter changes
- Bernoulli's Energy Equation
  - Torricelli's Theorem
  - Siphon
  - Full pipe flow
  - Head Loss
- Pipe Networks
  - Closed channel
  - Open Channel
  - Distributing water
- Water supplies
  - Hardness
  - Treatment

Comments
Questions
or
Discussion