COURSE UN 0807

POWER PLANT THERMODYNAMICS

COURSE STRUCTURE

COURSE MATERIAL

The course material consists primarily of the following:

- Lecture Notes: Extracts from UNESCO sponsored Encyclopedia of Life Support Systems (EOLSS) accessible on the UNENE website but password protected.

- Overhead Slides: Copies of overhead projector slides as used in the lectures and accessible on the UNENE website. They are however subject to change as the course progresses.

- Question Bank: Past examination questions from UNENE and UNB courses as well as from the NB Power operator and shift supervisor training program.

THERMO PRIMER

This course follows directly on from the *Thermodynamics Refresher Course* which defines the prerequisite material for UN 0702. It is assumed that students have this prerequisite knowledge (thermodynamic power cycles) and skill (use of steam tables and thermodynamic charts) before starting UN 0702. In essence students should be able to do all the questions in the Thermo Primer Question Bank.

LECTURE SCHEDULE

Normal Daily Schedule for *Power Plant Thermodynamics*

Start 9.00 am
Lecture 9.00 am - 10.30 am
Lecture 10.45 am - 12.00 noon
Lunch 12.00 noon - 1.00 pm
Lecture 1.00 pm - 2.00 pm
Lecture 2.15 pm - 3.15 pm
Tutorial 3.30 pm - 5.00 pm
End 5.00 pm

This gives approximately 30 contact hours over three weekends which roughly maintains the required 36 contact hours for a regular university credit course and it fits within a normal 8 hour working day.

ASSIGNMENTS

There will be two assignments due first thing on Saturday morning immediately before the start of the second and third modules respectively:

- Assignment #1: Analysis of Effectiveness of Available Energy Transfer in a Heat Exchanger.

- Assignment #2: Calculation of Rate of Heat Transfer in a Heat Exchanger.

Each assignment must be fully typewritten and professionally presented (bound or fixed in a suitable cover – not loose leaf stapled) with text, diagrams and calculations laid out logically. The calculations must show algebraic equations applicable, numerical values used and all steps shown so that they can be properly checked. Hand calculations are required so that all steps can be verified. The assignments must include the following:

- Introduction
- Technical Drawings
- Design Specifications/Operating Parameters
- Theory and Equations Used
- Definition of Data Used
- Assumptions Made
- System Diagrams
- Numerical Solutions (showing all steps)
- Results
- Comparison with Specified Parameters (if applicable)
- Discussion on Validity of Results

Any real heat exchanger within the thermodynamic cycle of the plant with which the student is familiar may be selected and the same one may be used for both assignments. Each student must select a different heat exchanger.

FINAL EXAMINATION

The final examination will consist of both descriptive questions (25-50%) and calculative questions (50-75%). There will be a limited choice but no compulsory questions. It will be a three hour closed book examination.

ASSESSMENT

The weighting for purposes of assessment will be as follows:

Assignment #1	20%
Assignment #2	20%
Final Examination	60%

Students must meet the academic standard of the institution at which they are registered.

UNESCO ENCYCLOPEDIA OF LIFE SUPORT SYSTEMS

The text for the course comes from the UNESCO sponsored EOLSS which is:

A source of knowledge for sustainable development and global security to lead to fulfillment of human needs through simultaneous socio-economic and technological progress and conservation of the Earth's natural systems.

It is an extensive body of knowledge for all people involved in policy making, project management, technological development, academic teaching, etc. Refer to the website www.eolss.net for complete details.

Within the scope of Energy there is a section on Thermal Power Plants from which selected chapters have been taken.