A POLYTECHNIC INSTITUTION

Course Outline

School of Manufacturing, Electronics & Industrial Processes
Program: Mechanical Engineering Technology
Option: Mechanical Systems

MSYS 3382
HVAC Load Analysis

Start Date:	September 5, 2006					**End Date:**	December 15, 2006		
Total Hours:	60	**Total Weeks:**	15			**Term/Level:**	3	**Course Credits:**	4
Hours/Week:	4	**Lecture:**	2	**Lab:**	2	**Shop:**		**Seminar:**	**Other:**

Prerequisites

Course No.	Course Name
MECH 1120	Energy Systems

MSYS 3382 is a Prerequisite for:

Course No.	Course Name
MSYS 4480	Air-conditioning systems
MSYS 4490	System Projects
MSYS 4486	Energy Management

Course Description

Establishes analytical backgrounds for calculating heating, cooling and ventilation loads required in occupied structures. Topics include the use of climatic data, psychrometric processes, comfort conditions criteria and ASHRAE and other industry standards for determining heat loss/heat gains. Computer aided techniques will be used.

Evaluation

(Course marks weighting is subject to adjustment)

Assigment	15%	Comments:
Mid-term Exam	35%	
Final Exam	50%	Change may be allowed to suit specific purposes. Notices will be given should any change occur.
TOTAL	100%	

Course Learning Outcomes/Competencies

Upon successful completion, the student will be able to:

1. Calculate the heat transmission coefficients for any building construction types.
2. Demonstrate a working knowledge of the physiological principles governing comfort and health by applying the ASHRAE comfort charts and air quality guidelines to HVAC system design.
3. Establish both indoor and outdoor design conditions for any building in any climate.
4. Calculate sensible heat, latent heat, and sensible heat ratio.
5. Conduct manually the heating, cooling and ventilation load analysis for any building.
6. Compute the heating, cooling and ventilation loads utilizing commercial software commonly used in HVAC industry.

7. Estimate heating, cooling and ventilation loads for various types of building by using industry standard methods (ASHRAE).

8. Use psychometric chart to quantify the physical and thermodynamic properties of the working fluids.

9. Compute the quantity and condition of supply and return air required for a specific HVAC application by using psychometrics.

10. Analysis air-conditioning processes on the psychometric chart.

11. Use computer software to conduct process analysis and refrigeration capacity calculations.

■ Verification

I verify that the content of this course outline is current.

Authoring Instructor	Date: Sept 1/06

I verify that this course outline has been reviewed.

Program Head/Chief Instructor	Date: Sept 1/06

I verify that this course outline complies with BCIT policy.

Dean/Associate Dean	Date: 2006/09/01

Note: Should changes be required to the content of this course outline, students will be given reasonable notice.

Instructor(s)

Joseph Cheung

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Office Hrs.: By Appointment
Office Phone: 604 451 6831
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Learning Resources

Required:

Lecture notes MSYS 3382 – HVAC Load Analysis

Recommended:

ASHRAE Handbooks - Fundamental

Information for Students

Note: Please refer to BCIT policy number 5002, Student Regulations Policy, for additional information. Policies are available at http://www.bcit.ca/about/administration/policies.shtml.

Ethics: BCIT assumes that all students attending the institute will follow a high standard of ethics. Incidents of cheating or plagiarism may, therefore, result in a grade of zero for the assignment, quiz, test, exam or project for all parties involved and/or expulsion from the course.

Assignments: Assignments, lab reports or projects must be done on an individual basis unless otherwise specified by the instructor. Late assignments, lab reports or projects will be devalued 20% per day late to a maximum of 3 days late.

Makeup Tests, Exams or Quizzes: There will be **no** makeup tests, exams or quizzes. If you miss a test, exam or quiz, you will receive zero marks. Exceptions may be made for **documented** medical reasons or extenuating circumstances. In such a case, it is the responsibility of the student to inform the instructor **immediately**.

Attendance: The attendance policy as outlined in BCIT Policy 5002 will be enforced. Attendance will be taken at the beginning of each session. Students not present at that time will be recorded as absent.

Illness: If you miss an evaluation such as an assignment, quiz, exam, or project, or you miss 3 or more consecutive days of class, you must provide the department with a BCIT Student Medical Certificate (available at http://www.bcit.ca/admission/downloads.shtml). You may be asked to complete the work that you missed or the course evaluation may be adjusted to reflect the missed component(s).

Attempts: Students must successfully complete a course within a maximum of three attempts. Students with two attempts in a single course must get written permission from the Associate Dean to attempt the course for the third time. Students who have not successfully completed a course within three attempts will not be eligible to graduate from the program.

Advancement: Students who fail three or more courses in a term cannot advance to the next term and may be asked to discontinue from the program.

Course Outline Changes: The material or schedule specified in this course outline may be changed by the instructor. If changes are required, they will be announced in class.

Assignment Details

Schedule

Week of/ Number	Outcome/Material Covered	Reference/ Reading	Assignment	Due Date
Week 1 Lab 1	Course outline Discussion			
Week 2 Lab 2	Module 1 – Thermal comfort Thermal comfort		1	End of lab
Week 3 Lab 3	Module 2 – Indoor Air Quality Ventilation calculations		2	End of lab
Week 4 Lab 4	Shinerama – No Class Module 3 - Psychrometrics			
Week 5 Lab 5	Module 4 – Sensible & Latent Heat Psychrometrics		3	End of lab
Week 6 Lab 6	Module 5 - Basic Heat Transfer Sensible & latent heat		4	End of lab
Week 7 Lab 7	Module 6 – Heating Load Basic heat transfer		5	End of lab
Week 8 Lab 8	Module 7 cooling Load Calculations Mid-Term Exam # 1			
Week 9 Lab 9	Mid-term exam answer review Heating calculation using Excel spreadsheet		6	End of lab
Week 10 Lab 10	Module 9 – Psychrometrics II - Heating & Cooling Processes Cooling Load Calculations using Excel Spreadsheet		7	End of lab

Week 11 Lab 11	Lab - Psychrometric II calculations Module 8 Trace Computer calculations		8 9	 Next lab Session
Week 12 Lab 12	Module 10 – Indoor Air Quality II Trace Load Calculations			 Next lab Session
Week 13 Lab 13	Lab - Indoor air quality II Trace Load Calculations		 10	 Next lab Session
Week 14 Lab 14	Final exam review Trace Load Calculations			
Week 15	Final Examination			