Course Description

Fundamentals of mine ventilation, including the principles of airflow, control of gases, dust, and temperature, methane drainage, mine fans, network theory, computer network simulation, mine ventilation system, and economics of airflow, with emphasis on analysis, systems design and practical application.

Prerequisites

Cv Eng 230, El Eng 282, and as co-requisite Mc Eng 227

Textbook


References


Schedule of Sessions

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
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<tbody>
<tr>
<td>01</td>
<td>Overview of course requirements; Environmental control of the mine atmosphere; Mathematical symbols; Map symbols (Chapter 1).</td>
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<tr>
<td>02</td>
<td>Mine Ventilation History; Mine gases; Detection and Monitoring (pp. 29-55, 225-232).</td>
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<tr>
<td>03</td>
<td>Lab session 1 – Properties and behavior of air (Chapter 2); Homework 1.</td>
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<td>04</td>
<td>Mine gases</td>
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<td>05</td>
<td>Lab session 2 – Psychrometric measurements (write-up of results for each lab are normally due the next lab session); Build stopping</td>
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<tr>
<td>06</td>
<td>Control of gases (pp. 55-74, 488-489, 494-495); Regulations (pp. 474-475, 530); Homework 2.</td>
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</tbody>
</table>
07 Dusts and other mine aerosols (pp. 77-113)
08 Lab session 3 – Instrumentation and monitoring
09 Control of dusts and aerosols; Personal protection (pp. 113-130)
10 Exam 1
11 Lab session 4 – Noise measurements; Build stopping
12 Ventilation control devices (pp. xvii-xviii, 462-469)
13 Airflow through mine openings (pp. 135-165)
14 Lab session 5 – Velocity and quantity.
15 Thermodynamic approach to mine ventilation (pp. 165-174)
16 Ventilation measurements (pp. 178-206); Homework 3.
17 Lab session 6 – Leakage determinations
18 Mine ventilation circuits (pp. 240-258)
19 Natural ventilation pressure (pp. 293-317)
20 Lab session 7 – Natural ventilation pressure
21 Air moving equipment (pp. 320-330, 348-353)
22 Fan characteristics (pp. 330-348); Homework 4.
23 Lab session 8 – Mine fans
24 Fan noise (pp. 334-336); Fan application to mines (pp. 355-387)
25 Fan selection (pp. 387-400)
26 Ventilation surveys (pp. 206-225)
27 Exam 2
28 Lab session 9 – Pressure-quantity survey in mine.

Spring Break Week of March 24~April 1
29 Ventilation networks: simple solutions (pp. 258-265); Homework 5.
30 Analysis of complex networks: simulation (pp. 265-288)
31 Lab session 10 – Ventilation network analysis (simulation).
32 Ventilation of work places; Auxiliary ventilation (pp. 405-420)
33 Controlled recirculation (pp. 420-428)

34 Lab session 11 – Ventilation network analysis (Continued).

35 Economics of airflow (pp. 431-451); Homework 6.

36 Coal mine ventilation systems (pp. 455-519)

37 Lab session 12 – Take down stopping (Last lab session.)

38 Metal mine ventilation systems (pp. 524-554)

39 Control of mine fires and explosions (pp. 562-580)

40 Heat sources and effects (pp. 585-616); Ventilation network simulation results from lab work due.

41 Exam 3

42 Mine air conditioning: psychrometric processes (pp. 619-631)

43 Air conditioning and heat transfer systems (pp. 631-660)

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Exams (3)</td>
<td>48%</td>
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<tr>
<td>Homework (6)</td>
<td>20%</td>
</tr>
<tr>
<td>Labs (10)</td>
<td>30%</td>
</tr>
<tr>
<td>Attendance</td>
<td>2%</td>
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</tbody>
</table>

Note 1 If you have fewer than 3 absences, you will get an additional 2% for attendance. If you have 3 or 4 absences, then you won’t lose any points on your final grade. If you have more than 4 absences, then you will be penalized 1% for each 2 absences.

2 An optional final exam will be given on Wednesday, May 15, 2002 at 2:30 P.M. If taken, you may replace your lowest exam score.