

## MINE 432

### Robotics and Industrial Automation in Mining

#### Mid-Term Report Essay

Value = 20%

The class will be divided up into groups of two students. Each group is to select one of the topics below and write a technical report on the topic. Alternatively, the group may suggest a topic and submit it for approval by the course instructor. The stages in writing your report are suggested as follows:

- define a critical question to be answered
- carry out a literature search
- develop an outline
- prepare the report (10-20 pages)
- elements to include in the report: abstract, introduction, literature synopsis, discussion of findings, conclusions, list of references
- Use of visual elements such as graphs, picture, photographs, tables is encouraged, but all should be cited

#### Topics - Mining

1. Automated Drilling Systems - open pit
2. Automated Drilling Systems - underground
3. Real-time ore data from drilling operations
4. Path-planning for Autonomous Haulage Trucks
  - localization (Where am I?)
  - navigation (Where am I going?)
  - object recognition and avoidance
5. Automated LHDs in Underground Mining
6. Automated Surveying in Underground Mining
7. The Impact of Automation on Mine Design
8. Automation in Blasting Practices
9. Communication Systems in Underground Mining
10. GPS Technology in Mine Automation

#### Topics - Processing

1. Innovations in On-Stream Analysis
2. Sampling Issues and Process Control in Mineral Processing
3. Heads or Tails? - feedforward vs. feedback control
4. Vision Systems in Froth Flotation
5. Vision Systems for Particle Size Analysis
6. Control Strategies for Flotation Circuits
7. Control Strategies for Grinding Circuits
8. Alarm and Interlock Systems in Mineral Processing Plants
9. Automation in Dewatering Processes
10. Keeping the Ore Flowing - Hang-ups in Bins, Chutes, and Conveyer Discharge Points