



WMI Akita Smart Mining Special Program Inter-University Exchange Project

Induction to Mining Foundational Stream 1

1 – 12 November 2021

FINAL REPORT



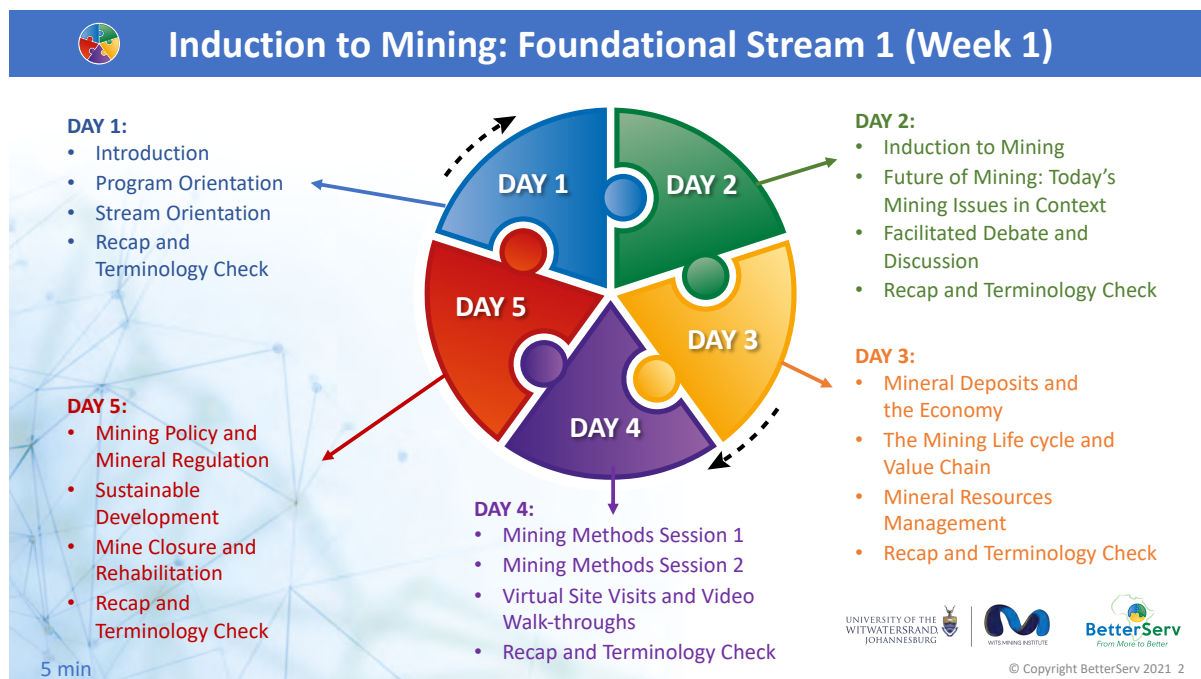
Akita University



WITS MINING INSTITUTE



1. COURSE PROGRAMME OUTLINE



Info: Streams Overview

Induction to Mining 1: Foundational (Stream 1)

Course Outcome:

Upon completion you will first, be able to:

1. Explain the role of mining in the global mining value chain with a foundational understanding of mining methods
2. Optimize your learning pathway

Learning Aims:

1. Develop a broad understanding of mining and its Value Chain
2. Appreciate the role of mining in the economy

Course Content:

1. Orientation
2. What is Mining?
3. Role of Mining
4. Technical Vocabulary
5. Mining Value Chain
6. Introduction to Mining methods

Induction to Mining 2: Technical (Stream 2)

Course Outcome:

Upon completion, you will better understand mining engineering subject areas, the disciplines in mining and current challenges. You will further develop your knowledge on mining regulation with specific reference to South African mineral law and policy.

Learning Aims:

1. Enhance understanding of mine technical disciplines within a 21st century mining context
2. Understand the policy and regulatory requirements of mining
3. Compile research report demonstrating understanding of course content

Course Content:

1. What is Mining Engineering?
2. Mining Disciplines
3. Twenty-first century mining issues
4. Mineral Law and Policy
5. Report writing

Short-Stay Internship at WMI: Vocational (Stream 3)

In response to: Resource Science Fieldwork Abroad (UG) 10 students; or Collaborative training of DigiMine (M2)

Course Outcome:

Upon completion of Week 1, you will be:

1. Equipped with the skills to work independently on your project
2. Able to collaborate in a multidisciplinary setting
3. Mentored for effective learning

Learning Aims:

1. Develop capabilities in research methodology and related laboratory work
2. Evaluate progress and the need for further support for successful project completion
3. Enhance multi-disciplinary teamwork across subject areas

Course Content:

1. Induction to University and Host Centre
2. Facilitated Project Workshop
3. Practical Work Under Supervision

5 min

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2. FLOW OF PROGRAMME

a) Content Relevance

The course is designed to offer a general and gentle induction to mining in a multi-disciplinary context. Over 5 days, it provides an overview of the key mining issues, principles and methods from an international perspective and a specific reference to Africa, and South Africa in particular – as these affect their study areas and futures. Students appeared to respond well to this general-local-relating-to-Japan approach. In particular, they were assisted by the exposure to real videos of surface and underground mining narrated by subject matter experts.

Each day built a fitness to academic and technical content. Day 1 focused on learner introductions, creating goodwill and rapport and understanding the flow of the week and the use of the Portfolio of evidence. It also covered key terminology (“nuggets”) of Day 2. Day 2 provided 2 key lecture modules with supporting activities. Day 3-5 provided 3 key lecture modules per day. Based on feedback from learners, this is a successful approach.

b) Student Study Areas

During Day 1 learner introductions, students shared their different study areas and interests. The generality of the programme suits a diverse (multi-disciplinary) group in order to cover the multitude of issues and factors involved in mining. There was also a good mix of focus areas and skills, which could be seen in the kinds of questions asked and feedback given. The Akita group included learners from Kyushu university and were from the Humanities, Sciences and Engineering Faculties with a focus areas that comprised of international politics, energy, geology, resource exploration and engineering, and resources policy, development and management. Learners were exposed to their learning preferences and thinking styles from questionnaires and feedback on how to use these more effectively. An issues game added contextual understanding, giving students the opportunity to research and present as many issues as possible regarding the mining sector.

c) Pace of Day 1-5

As part of our preparation there was a deliberate attempt to gradually increase technical content while addressing the language barrier, which became less and less of an issue as the week progressed. Programme hosts checked the pace regularly to ensure that the majority of students were progressing adequately throughout the programme. On Day 2 (2 lecture modules with supporting activities), a general poll was issued to check overall pace. A total of 85% of students were satisfied with the pace; 15% said it was too slow. Day 3 saw the introduction of 3 lecture modules; this addressed an increased pace. In-course feedback allowed us to address vital issues and continue motivate for learning.

d) Support of Teaching Assistants & Professor Visits

The two teaching assistants assigned to the programme for Week 1 provided valuable support and assistance. Their presence and superior language ability was a benefit at certain points; however, this was not often needed. The frequent support of Professor Miyamoto as an overseeing professor within the students' study field was also highly beneficial. When home lecturers are able to visit spontaneously and participate in a programme, especially one that is delivered online, this adds a strong sense of credibility and importance to the course. As mentioned though, students already demonstrated self-motivation and dedication without these additional factors.

3. INTERACTION & STUDENT PARTICIPATION

a) Learner Introductions

On Day 1, learners were given the opportunity to introduce themselves briefly in English. This was important to create a sense of rapport and connectivity within the student and lecture-host body. Students were clearly not familiar or comfortable with the English language, but all participated and gave adequate details to share with the group.

b) Student Attendance

Attendance was consistently good, although some students were not well and/or had other commitments during the course and had to excuse themselves at times. Here the recordings of lecture sessions are helpful to provide a good alternative. The 4 students from Kyushu university were also not able to attend all sessions, which changed the size of groups, but this was handled with a positive attitude of learners. Some of the students did not participate as well as others, but we understand that this is a normal dynamic, especially when considering language exposure.

Ice-breakers & Rest Breaks

These were a regular and important aspect of each day's activities. Students enjoyed the music and movement activities greatly, especially those with a focus on the vernacular Nguni language of Southern Africa – isiZulu, and the integration of English. The host lecturers truly enjoyed seeing the students enjoy themselves for a few minutes daily in doing something not strictly academic, but which truly contributes to the learning and living experience. Language immersion is also greatly assisted by enjoyable activities.

c) Reflection Questions

As mentioned, the programme of each day provided for reflection questions to enable the use of meta-cognition (required for deep knowledge processing). Where time was limited,

students were given the opportunity to complete additional reflection activities after each day in their portfolios as self-developmental tasks. As mentioned later in the report, students who completed their portfolio activities performed better in comparison.

Team Activities

A total of 6 teams were formed with the student group of 33 members. From observations and feedback given, 3 groups in particular worked well together by involving all team members and running each meeting in breakout rooms in English with equitable participation by all. The other 3 groups were more individually driven and did not operate as a team. This was evident in the quality of their feedback in week 1. However, in week 2, teams were decreased to a total of 5 groups and students clearly overcame any barriers to work together and create outstanding presentations.

Once again, we must consider that the constraints of leadership and language familiarity will play a major role. Overall, team activities were well organised and well supported with some teams and individuals distinguishing themselves and being awarded with achievement certificates on Day 5. As will be further referred to in Appendix B (see page 11), students' level of participation and outcomes were visibly accelerated within the week 2 group assignment process.

Student Assessment

Assessment was done through a group assignment, where students presented their work on the final day of the course. Individual Portfolios of Evidence (PoE) were meant as a personal record of each individual's continuous development during and after the course. Submission of PoEs was voluntary and although graded, not included in the final mark. All students in a group received the overall mark of the assessed assignment by four assessors, who submitted their marksheets independently. The average mark was accepted as the final mark for each group. The quality of the assignments and the presentations was above-average and above expectation considering the language barrier (See Appendix A for the Wits Mining Institute letter stating the final marks of students).

Overall, questions were answered well and competently, even if further explanation was required. Novel approaches given to policy issues in selected countries, for example mineral product uses, child labour, tribal land exploitation and greener energy. Systematic observance of planning and structural requirements; excellent research skills and information sourcing, effective slide development; solid ideas and clear synthesis and fact integration; generally clearly structured arguments; strong, logical argumentation and teamwork labour division, sophisticated integration of knowledge acquired; insightful contextual analysis, efficient time management.

Group names and Final Assignment Mark	Members	PoE Grading
Group 3: Namahage (87%)	Shoma HIRATSUKA	With Distinction
	Naoki ADACHI	With Distinction
	Emina SATO	Inadequate
	Yusa ITO	Inadequate
	Hisae YAMAUCHI	Special mention
Group 5: R2 (89%)	Toshitada SASAKI	With Distinction
	Taiju TAKAHASHI	Special mention
	Ryosuke NAKASHIMA	Failure to submit
	Ryosuke KOBAYASHI	Special mention
	Noa FURUKAWA	Adequate
Group 1: Owl (76%)	Tamaki KAWAMURA	Adequate
	Soma ABE	Failure to submit
	Jumpei TOMITA	Special mention
	Kohei MIURA	Inadequate
	Misato KUNIBA	Adequate
	Hayato KIYA	Inadequate
Group 4: Ramens (79%)	Motomichi ARAKIDA	Special mention
	Satoko ITO	With Distinction
	Hiromi KOBAYASHI	Special mention
	Kazuma YOSHIDA	Special mention
	Rin SATO	Special mention
	Shunta FUJII	Failure to submit
Group 2: Times (73%)	Yuto ONO	Adequate
	Takumi SUGIMOTO	Special mention
	Kyohei TOSAKA	Inadequate
	Ryusei ENDO	Failure to submit
	Seira IZAWA	Adequate
	Mizuki TAIRABUNE	Adequate
	Hirose KANEHIRA	Adequate

Course Awards

In addition to the Group assignment and the individual PoEs, Certificates of Achievement were awarded to Groups and Individuals for Dedicated Participation & Goodwill and Best PoE during the course. The table below provides details on the recipients.

Name of Learner/Team	Certificates Received Week 1
Winning Team: Ramens Satoko ITO Hiromi KOBAYASHI Kazuma YOSHIDA Rin SATO Shunta FUJII Yuto ONO	Certificate of Achievement: Winning Team for Dedicated Participation & Goodwill (each team member received a certificate)
Shoma HIRATSUKA	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Naoki ADACHI	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Jumpei TOMITA	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Toshitada SASAKI	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Name of Learner	Certificates Received Week 2
Satoko ITO	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Ryosuke KOBAYASHI	Certificate of Achievement: Individual Award for Dedicated Participation & Goodwill
Satoko ITO	Certificate of Achievement: Joint Award for Best Portfolio of Evidence (Graded at 90%)
Naoki ADACHI	Certificate of Achievement: Joint Award for Best Portfolio of Evidence (Graded at 90%)

4. LEVEL OF QUESTIONING

A variety of questioning techniques were used to support clarity and interaction with students. These included the following:

- a) In-lecture questions
- b) Daily PoE reflection activities
- c) Structured Q&A sessions
- d) Post-session feedback and individual questions sent directly to the SA Team
- e) Emails with further requests for support, including calculations

5. TERMINOLOGY & LANGUAGE PROFICIENCY

To bridge the gap, the Portfolio of Evidence and Daily “Nuggets” provided help with vocabulary, technical terms and understanding of mining concepts. This also provided a means to do revision, introduce the “Nuggets” of the following day and link them with what the students had learned already. It was encouraging to see in some portfolios how definitions given and clarified in class were integrated into post class activities.

6. COURSE EVALUATION

Students provided course evaluation feedback at the end of Day 5 to enhance the programme for Week 2 support and summative task preparation, and also for the future use of the programme. In addition, regular opportunities were provided daily for learners to give their feedback, either orally or via the Zoom chat box. Further opportunity to include comments and to demonstrate the extent of learning was given through the individual Portfolios of Evidence, which all students were required to submit individually at the start of Week 2. More detail will be provided about student feedback in the appendix (See Appendix B).

7. APPENDICES

- A) **WMI Letter to Akita University with Grade Sheet** (Separate document)
- B) **Course Feedback** (Included in this Report)

8. CONCLUSION

The course is testimony of a meaningful and functional collaboration between two universities. The Wits Mining Institute was able, because of its association with the BetterServ Group, to deliver on relatively short notice to conceptualise, design and deliver a high-quality course on Induction to Mining for undergraduate Akita University students in a multi-disciplinary context. The quality of students was such that they could cope over

a two-week intensive learning period covering complex mining topics and in the English language. The high performing students actively asked questions and completed their assigned portfolio activities daily, while lower performing students did not engage to the same extent. The level of language was seen to be appropriate for 32 out of the 33 students.

Apart from the administrative lessons, there were also important academic delivery lessons learnt, for example: More resources and time were required than originally planned for; Mining graphics must be used for 'power-moments'; and Day 1 orientation can be enhanced to cover more general topics about South Africa and Africa as a continent, with some allowance for pre-reading and learning style activities assigned before the course for greater application. Akita student's level of energy and participation surpassed expectations and comparative experiences with similar groups. The use of cultural artefacts, such as isiZulu dancing, breaks for rest and refocus, clearly succeeded and must be considered in future courses. Seeing students responding maturely and professionally to information beyond their years gave us as lecturers, great hope for the next generation.

Frederick Cawood and Charlotte Jean



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Appendix B – Course feedback

The course feedback was positive. Overall, the course met or exceeded learners expectations; the administration was found adequate and the pace appropriate.

Specific comments include the following:

“There were things I didn't know, so I had a hard time understanding, but I was able to learn deeply.”

“I realized how important investment is in mining. I realized once again the importance of mines without investment and exploration.”

“Mining method and its video was good. Because I haven't learned it in my course. So mining video is exciting for me. I want to go some mine to see someday.”

“I was excited all your lectures. What I learned in this course will help me to increase motivation to learn about resource and sustainable development.”

“I am sorry that I could not respond well to some of the questions because I could not understand the intent of the questions due to my English skills. Even so, there was much to learn, and it was a very valuable experience. Thank you very much.”

“It was good opportunity to do presentation in English.”

“Since most of the course was different from the field I usually study, I had a hard time understanding it because I didn't know the basic content including vocabulary, etc. However, I enjoyed it because it was a field that I would not have studied at university unless this happened.”

“I couldn't go South Africa but I could feel culture and words a bit, so I had an unforgettable time. Thank you for instructing a lot of information.”

“Throughout this week, I have had a good opportunity to learn various genres from South Africa's policies to development. What impressed me was the mining life cycle. I only understood roughly, but I was able to learn more deeply in this lecture than last time and it was one of the opportunities for future learning.”