UNIVERSITY OF EXETER

MODULE TITLE	Mine Automation	CREDIT VALUE	15
MODULE CODE	CSMM418	MODULE CONVENER	Dr Declan Vogt (Coordinator)

DURATION: TERM	1	2	3
DURATION: WEEKS	0	11	0

Number of Students Taking Module (anticipated)	10

DESCRIPTION - summary of the module content

Mine Automation has begun to revolutionise the ways in which we operate a mining project. This module gives you the opportunity to investigate the various levels of mine automation currently utilised within the industry, along with its rationale. Furthermore, it will examine the current research position of those companies and institutions involved in developing mine automation with the ultimate goal of a 'personless' mine.

AIMS - intentions of the module

The purpose of this module is to develop the understanding of Mine Automation and realise the importance of its implication in a mining context. It is designed to engage you in the research that is on-going in these areas in a mining, academic and international context.
This module covers Specific Learning Outcomes in Engineering, which apply to accredited programmes at Bachelors/MEng/Masters level. These contribute to the educational requirements for CEng registration (as defined under the UK Standard for Professional Engineering Competence – UK-SPEC).

INTENDED LEARNING OUTCOMES (ILOs) (see assessment section below for how ILOs will be assessed)

On successful completion of this module **you should be able to**:

Module Specific Skills and Knowledge
1. Understand the state of the art in Mine Automation as being utilised by the mining companies

2. Consider the selection of an appropriate Mine Automation method for a particular mining context

Discipline Specific Skills and Knowledge
3. Appreciate Mine Automation within the various mining sectors of the modern technological world

4. Fully comprehend this rapidly advancing technological field and its social and economical implications

Personal and Key Transferable / Employment Skills and Knowledge
5. Concisely present written data to a tight deadline

6. Reveal an insight into the role, importance and application Mine Automation in the professional mining engineering environment

SYLLABUS PLAN - summary of the structure and academic content of the module

Mining today and the future – Current challenges including: technical, economical, environment and safety. Deeper mining. Lower grade ore. Ventilation and cooling issues. Mechanised processes for improved safety and economical value.
Automation – General introduction. Case studies from other industries. Challenges in mining – technological barriers, legislation, safety (interaction between humans and machines).
Underlying technology – Telecommunications and IT, Navigation, Robotics, Surveying, Monitoring and control systems.

Current technology:
Open pit mining technology – GPS and precision navigation, mobile/wireless communications.
Underground mining (hardrock) – transport/haulage, tracking and communication
Mine planning and optimisation (open pit and u/g)

Future technology:
Advanced navigation
Fully automated production and development
Change management

LEARNING AND TEACHING

LEARNING ACTIVITIES AND TEACHING METHODS (given in hours of study time)

Scheduled Learning & Teaching Activities	31.00	Guided Independent Study	119.00	Placement / Study Abroad	0.00

DETAILS OF LEARNING ACTIVITIES AND TEACHING METHODS

Category	Hours of study time	Description
Scheduled learning & teaching activities	30	Lectures with integrated tutorials
Guided independent study	119	Private Study

ASSESSMENT

FORMATIVE ASSESSMENT - for feedback and development purposes; does not count towards module grade

Form of Assessment	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Questions asked of students in lectures			Feedback provided on the spot in lectures

SUMMATIVE ASSESSMENT (% of credit)

Coursework	30	Written Exams	70	Practical Exams	0

DETAILS OF SUMMATIVE ASSESSMENT

Form of Assessment	% of Credit	Size of Assessment (e.g. duration/length)	ILOs Assessed	Feedback Method
Examination	70	2 hours	1, 2, 3 and 6	Examination Mark
Mine Automation Assignment	30	15 pages	2, 3, 4, 5 and 6	Written

DETAILS OF RE-ASSESSMENT (where required by referral or deferral)

Original Form of Assessment	Form of Re-assessment	ILOs Re-assessed	Time Scale for Re-assessment
Summative assignment	Additional Summative assignment	Weighting as above	August Ref/Def Period
Examination	Additional Examination	Weighting as above	August Ref/Def Period

RE-ASSESSMENT NOTES

As above 1 piece of CW 30% and/or 1 Exam 70%

RESOURCES

INDICATIVE LEARNING RESOURCES - The following list is offered as an indication of the type & level of information that you are expected to consult. Further guidance will be provided by the Module Convener

Basic reading:
30th International Symposium of Automation and Robotics in Construction and Mining (ISARC 2013) Proceedings, ISBN: 978-1-926872-16-2
ELE: http://vle.exeter.ac.uk/

Web based and Electronic Resources:
http://www.mineautomationafrica.com/Default.aspx
http://www.wmc-expo2013.org/
http://www.mineautomation.com.au/wa/
http://www2.sandvik.com/sandvik/0120/Internet/Global/S003715.nsf/LUSL/SLFrameForm14D46ACF97A3ECCAEC12577D20067E35F?OpenDocument

Other Resources:

Reading list for this module:
There are currently no reading list entries found for this module.

CREDIT VALUE	15	**ECTS VALUE**	7.5
PRE-REQUISITE MODULES	None		
CO-REQUISITE MODULES	None		
NQF LEVEL (FHEQ)	7	**AVAILABLE AS DISTANCE LEARNING**	No
ORIGIN DATE	Thursday 06 July 2017	**LAST REVISION DATE**	Thursday 16 December 2021
KEY WORDS SEARCH	Mine automation, robotics		