





Implementation of Master Program in:

Reservoir Engineering; Exploration, Evaluation and Environment

Universidad Mayor de San Andres La Paz - Bolivia

MSC. ING. MARCO A. MONTESINOS M. PROJECT COORDINATOR

TRONDHEIM, NORWAY - FEBRUARY 26, 2019



Master Program: Reservoir Engineering; Exploration, Evaluatio

n and Environment

Presentation content

- A. PROJECT OVERVIEW
- B. ACADEMIC PROGRAMMES
- C. OVERVIEW OF RESEARCH ACTIVITIES
- D. RESEARCH FACILITIES SUPPORTED BY EnPe
- E. DATABASES DEVELOPED
- F. GRADUATION CEREMONY
- G. ANNEXED ACTIVITIES



A. PROJECT OVERVIEW

Master Program: Reservoir Engineering; Exploration, Evaluation and Environment

STUDENT SELECTION

SYSTEM

SCHEDULE OF **ACTIVITIES**

- Publication of call in the written press of national circulation
- Selection test
- Interview for final decision



EL DIARIO 2X25 DOMINGO 26 DE JUNIO DE 2016 Bs. 1.580,00 .-

CRONOGRAMA DE SELECCIÓN A **POSTULANTES AL PROGRAMA DE**

"MAESTRIA EN INGENIERIA DE RESERVORIOS: EXPLORACION **EVALUACION Y MEDIO AMBIENTE"**

8 de Julio: Presentación de documentos. Hasta

horas 11:00

11 de Julio: Examen de selección (temas:

Geología, Perforación v

Reservorios). A horas 10:00 en el

aula 103 – facultad de ingeniería

14-15 de Julio: Entrevistas a partir de horas 9:00 en

dirección de carrera.

19 de Julio: Reunión con el coordinador en

> Noruega - Dr. Udo Zimmermann. Cena a horas 19:00, lugar por

confirmar.

ANNOUNCEMENT It is done by written press, This includes:
• Requirements

Enrollment period

Program curriculum Title to grant



A. PROJECT OVERVIEW

Master Program:
Reservoir
Engineering;
Exploration,
Evaluation
and Environment



GENDER	NUMBER	%
FEMALE	16	29
MALE	40	71
TOTAL	56	100



An image of the admission test taking. 49 candidates applied for this test.

Exam topics:

- Drilling
- Reservoir Engineering
- Geology



Master Program: Reservoir Engineering; Exploration, Evaluation and Environment

STUDENT SELECTION SYSTEM – Interview

APPROVED WITH NOTES GREATER THAN 60% REPROVED WITH NOTES LESS THAN 40% THEY DID NOT ATTEND THE EXAM REPROVED WITH NOTES GREATER THAN 40% APPROVED WITH NOTES LESS THAN 60%

MAESTRIA EN IONGENIERIA DE RESEOVORIOS: EXPLORACION EVALUACION Y MEDIO AMBIENTE

RESULTS OF THE SELECTION EXAM

		_	00.		
	APROBADOS		REPROBADOS		ENTREVISTA
1	6815398 LP	1	4310687 LP	1	6986595 LP
2	8336676 LP	2	6765569 LP	2	5995314 LP
3	4776180 LP	3	6106854 LP	3	4938188 LP
4	4913083 LP	4	6750336 LP	4	5973967 LP
5	6139282 LP	5	6871133 LP	5	8327090 LP
6	4882135 LP	6	9108071 LP	6	7089904 LP
7	6794319 LP	7	6121407 LP	7	9188135 LP
8	7032308 LP	8	9216489 LP	8	7609817 BE
9	8302740 LP	9	4745299 LP	9	6851227 LP
10	6151410 LP	10	6768453 LP	10	6951303 LP
11	6815572 LP	11	6086133 LP	11	6143523 LP
12	6901476 LP	12	9091281 LP	12	6966141 LP
13	6846566 LP	13	8334547 LP	13	6156367 LP
14	7024020 LP	14	4997248 LP	14	7629547 BE
15	6923742 LP	15	4900292 LP	15	5681344 CH
		16	6837875 LP	16	8291806-11 LP
		17	4856919 LP	17	6853893 LP
		18	4309296 LP	18	6897494 LP
				19	8278567 LP
In the in	toniow	tk	20	20	6173272 LP
ii i nie ii	irei view,	u	IC	21	4790762 LP
TOIIOWIN	iterview, g factors	5 V	vere	22	4823329 LP
taken in	ito accoi	ın	ıt·	23	4825020 LP

- The predisposition for full-time study, taking into account that many of the teachers will come from abroad and give intensive classes.
- •His predisposition to be teachers in the future, with the aim of having teachers for similar programs in the future.



A. PROJECT OVERVIEW

NOMINA DE ESTUDIANTES

Master Program:
Reservoir
Engineering;
Exploration,
Evaluation
and Environment

NOMINE OF REGISTERED STUDENTS

GENDER	NUMBER	%
FEMALE	15	34
MALE	29	66
TOTAL	44	100

IVOIVIII	VA DE ESTODIANTES		
No.	APELLIDOS	NOMBRES	CEDULA DE IDENTIDAD
1	ALCON CHAMBI	SANTOS	6143523 LP
2	ARREDONDO APARICIO	ALVARO MARTIN	6815398 LP
3	ARTEAGA SORUCO	MAURICIO ALEJANDRO	8336676 LP
4	AYALA POLO	ELMER MARTIN	3376423 LP
5	BOZO GONZALES	CARLOS ROBERTO	4776180 LP
6	CACERES LARICO	SAULO HANS	6986595 LP
7	CAPQUIQUE CHOQUE	JHONNY WILLIAM	5995314 LP
8	CHAMBI RAMOS	PAMELA ZULEMA	4913083 LP
9	CHAVEZ CHOQUE	VIDAL ULISES	6139282 LP
10	CHIPANA KERGUA	VICTOR HUGO	4309296 LP
11	CHIPANA YUCRA	LUIS ADRIAN	6966141 LP
12	CONDE CHOQUE	CARLA MABEL	4310687 LP
13	CORITZA TAQUICHIRI	DANIEL IGNACIO	6156367 LP
14	CUENCA MAGNE	ALEIDA CLAUDIA	6106854 LP
15	CONDORI MARTINEZ	ROGER NEIL	4882135 LP
16	CUELLAR GUASDE	KRISHIAT ALEXANDRA	7629547 BN
17	DAZA BLANCO	MARIO	3381048 LP
18	DIAZ ALANOCA	RINO ROBER	6794319 LP
19	ESPADA ROMERO	HENRY MILTON	5681344 CH
20	ESPEJO MAMANI	PATRICIA GABRIELA	4938188 LP
			8291806-
21	FERNANDEZ QUILLA	JACQELINE XIMENA	1I LP
22	FLORES CAYO	LUIS RAMIRO	7032308 LP
23	FUENTES SOLIZ	HUGO MAURICIO	8302740 LP
24	GARECA QUISPE	MARION ROSY	6853893 LP
25	GUZMAN MAYDA	DANNY EMANNUELE	5973967 LP
26	HERRERA CALLEJAS	HERMAS	467339 LP
_27	HUMEREZ VARGAS	FERNANDO	6151410 LP
28	IRIARTE GAMBOA	BRYAN ADRIAN	6897494 LP
29	LAURA CHUQUIMIA	ELIZABET ROSALIA	8327090 LP
30	LIMACHI LIMACHI	SALVADOR YAMIL	6815572 LP
31	LOPEZ VELASQUEZ	SHIRLEY SUSANA	3056521 OR
32	MAMANI OCHOA	ANDREA ISABEL	6871133 LP
33	MENDOZA SARCO	GRECIA CAROLINA	8278567 LP
34	MORALES PEÑARANDA	STEPHANY LUISA	9108071 LP
35	QUISPE MOLLO	FRANZ EVER	7089904 LP
36	RAMIREZ SANCHEZ	WILDER FREDDY	4790762 LP
37	RAMOS MALDONADO	RUBEN JUNIOR	6901476 LP
38	RAMOS MAQUERA	BERNARDINO	9188135 LP
39	SANCHEZ SAINZ	CESAR AUGUSTO	6846566 LP
40	SILVA PILLCO	JAZMIN ELIGIA	7609817 BN
41	TARQUI ACARAPI	JIMENA LIDIA	7024020 LP
42	USQUIANO MARQUEZ	STEFFI LAURA	6923742 LP
43	VILLEGAS ARRAYA	RODRIGO	4825020 LP
44	YUJRA HUANCA	MILTON RODRIGO	6951303 LP



A. PROJECT OVERVIEW

Opening ceremony

- •It took place in the UMSA Honors Hall on August 29, 2016.
- This important event was attended by the main authorities of the UMSA, the program coordinators, students and their families









B. ACADEMIC PROGRAM

Master Program:
Reservoir
Engineering;
Exploration,
Evaluation
and Environment

National Teacher (5)
Foreign Teacher (10)

SUBJECT	TEACHER
FIRST SEMESTER	
PET-501 Enhanced Oil Recovery I	PhD. Cristina Moya -
PET-510 Fieldwork Techniques for Engineers I	PhD. Udo Zimmermann
PET-520 Info. systems applied to the Expl. of Hyds.	MSc. Ing. Lisa Bingham
MPE-250 Metodología de la Investigación Científica	MSc. Ing. Daniel Álvarez
SECOND SEMESTER	
PET-601 Deposition Systems in Oil Reservoirs	PhD. Bahlburg
PET-610 Advanced Structural Analysis in Reservoirs	PhD. Fernando Hong
PET-620 Seismic Reflection Methods for Res. Eng.	M.Sc. Diego Venturo
PET-630 Petrophysics and Seismic Anal for res.eng.	PhD. Carlos D'Arlach
PET-640 Seismic Interpretation for Res. Engineering	MSc. Ing. Dora Marín
TERRED AFMEATRE	
TERCER SEMESTRE	
PET-701 Reservoir Geophysics	M.Sc. Luis Pili Tunici
	M.Sc. Luis Pili Tunici PhD. Carlos D'Arlach
PET-701 Reservoir Geophysics PET-710 Integrated Basin Analysis, Reservoirs and	
PET-701 Reservoir Geophysics PET-710 Integrated Basin Analysis, Reservoirs and their Evaluation PET-720 Characterization of Reservoirs and Advanced	PhD. Carlos D'Arlach
PET-701 Reservoir Geophysics PET-710 Integrated Basin Analysis, Reservoirs and their Evaluation PET-720 Characterization of Reservoirs and Advanced Applied Methods	PhD. Carlos D'Arlach PhD. Udo Zimmermman
PET-701 Reservoir Geophysics PET-710 Integrated Basin Analysis, Reservoirs and their Evaluation PET-720 Characterization of Reservoirs and Advanced Applied Methods PET-750 Environmental Management	PhD. Carlos D'Arlach PhD. Udo Zimmermman



STUDY ENVIRONMENTS CLASSROOMS – LIBRARY

> Av. Andrés Bello – Calle 30 Campus UMSA

La Paz - Bolivia







Schedule of activities

B. ACADEMIC PROGRAM

- There are 15 modules according to the Norwegian model of the University of Stavanger
- Classes began in October 2016 and ended in February 2018
- Students will take approximately 6 months to complete their thesis
- •The paperwork required for graduation takes around two months
- On November 14, 2018, 32 Magister on Sciences were graduated

	YEAR			2016	i							2	017											2018					
	MONTH	AUG	SEPT	ОСТ	NOV	DEC	ENE	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	ОСТ	NOV	DEC	ENE	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	ОСТ	NOV
LETURE	TEACHER																												
Sedimentologia/EOR	Moya																												
Trabajo en el campo I	Zimmermann																												
GIS	Bingham																												
Metodologia	Alvarez																												
Deposition estratigrafia	Bahlburg																												
Geologia estuctural	Hong																												
sismica relexion	D'Arlach																												
petrofisica	Venturo																												
sismica	Pilli																												
geofisica	D'Arlach																												
cuencas y evaluacion	Zimmermann																												
caract de reservorios	Marin																												
Medio ambiente	Choque																												
campo II	Zimmermann																												
seminario de tesis	Zimmermann																												
tesis																													
Graduation ceremony																													



C. OVERVIEW OF RESEARCH ACTIVITIES

Facilitated 13 UMSA studnets to visit UiS for the purpose of doing research for their MSc theses

Basically they did the following research:

- Petrography
- Rock dating UPB method (uranium-lead)
- Zirconium dating (crystallization age)









D. RESEARCH FACILITIES SUPPORTED BY EnPe

These were:

- A geology laboratory was equipped, which is part of the INSTITUTO INGENIERIA PETROLERA
- •Time has been achieved for a teacher who takes charge of this laboratory full time. It is intended to do scientific research and provide services to the industry.
- 13 students of the program traveled to Norway to do research in UiS laboratories, an aspect that contributed to the development of their theses.
- Five field trips were made, in different subjects with which they had good practice.

Nº	EQUIPO	CANTIDAD	PRECIO UNITARIO (Bs.)	PRECIO UNITARIO (USD)	PRECIO TOTAL (Bs.)	FECHA		
1	EQUIPOS DE COMPUTACION CORE 17-6TA GENERACION, 32 RAM	5	19 650,00		98250	17/03/2017		
2	EQUIPOS DE COMPUTACION CORE 17-6TA GENERACION, 16 RAM	10	10 117,00		101170	17/03/2017		
3	BALANZA ANALITICA	1	26 731,00		26731	02/02/2017		
4	MICRÓMETRO DIGITAL DE 2 PIEZAS	1	4 591,00		4591	15/12/2016		
5	MAQUINA CORTADORA DE ROCAS- MODELO CS 200 – VINCI TECHNOLOGIES	1		24 168,53	168212,96	13/06/2017		
6	UNIDAD DE VACIO – MODELO VEU – VINCI TECHNOLOGIES	1		15 545,83	108198,97	13/06/2017		
7	MAQUINA PULIDORA DE ROCAS, MODELO SGL200 — VINCI TECHNOLOGIES	1		35 244,82	245303,94	13/06/2017		
8	ESTERIOMICROSCOPIO – VINCI TECHNOLOGIES	1	33 782,00		33782	22/12/2016		
9	MICROSCOPIO PETROGRAFICO – VINCI TECHNOLOGIES	1	62 604,00		62604	15/12/2016		
10	MICROSCOPIO	1		6 641,09	46221,99	13/06/2017		
11	VORTEX SIMPLE CON GRADILLAS Y TUBOS	1		1 355,17	9431,98	13/06/2017		
12	ACCESORIOS DE 100X PARA MICROSCOPIO	1		1 482,90	10320,98	13/06/2017		
13	ARALDITE Y ENDUIRECEDOR	1		2 000,00	13920	13/06/2017		
	GRAN TOTAL (Bs.) 928738,82							



D. RESEARCH FACILITIES SUPPORTED BY EnPe

Among the acquired equipment can be highlighted:

- Three microscopes
- Computer equipment of 16 and 32 RAM
- Rock cutting machine
- Rock polishing machine
- Accessories and supplies





















E. DATABASES DEVELOPED

The developed works showed a high scientific value, this was the opinion of Professor Luis Pili, who also works in the National Agency of Hydrocarbons.

- Geochemical data and dating of the rocks of the Copacabana, Kasa and Cancañiri formations.
- In Bolivia, the Devonico rocks have the maximum development at the regional level. However, the study was almost null, with this project two zones of contribution to the basin were defined





F. GRADUATION CEREMONY

The graduation ceremony was held in the auditorium of the UMSA

- This event was held at the UMSA PARANINFO on November 14, 2018.
- This important event was attended by the main authorities of the UMSA, EnPe, UiS, the program coordinators, students and their families









F. GRADUATION CEREMONY

- Se graduaron 32 de los 44 inicialmente inscritos
- Un estudiante mas completo su graduación en Diciembre de 2018.

	FEMALE	MALE	TOTAL
GRADUADOS	12	20	32
ABANDONO	1	4	5
SE GRADUARA EN OTRA	2	5	7
TOTAL	15	29	44









Among these activities are:

- 1. Opening of the 2nd cycle of the MASTER'S PROGRAM IN OIL ENGINEERING
- 2. Opening of the 2nd cycle of the MASTER'S PROGRAM IN RESERVOIR ENGINEERING EXPLORATION, EVALUATION AND ENVIRONMENT
- 3. Services offered to the Industry Item for full-time teacher to take over the Geology lab
- 4. Participation in the 11th South American Symposium on Isotope Geology
- 5. Participation in the 2018 EAGE ANNUAL Contest



1. OPENING OF THE MASTER'S PROGRAM IN PETROLEUM ENGINEERING – 2nd cycle

- It has started in June 2017 and will end in April 2019
- •It is estimated that about 24 magisters will graduate
- There is a potential of 7 teachers for future programs
- •The brouchure shows the call made.





1. OPENING OF THE MASTER'S PROGRAM IN PETROLEUM ENGINEERING – 2nd cycle

DESCRIPCION/DESCRIPTION	No.
Varón /male	27
Mujer/female	2
Potencial docente/Teaching potential	7
Abandono/ Abandonment	5

- This is the first SELF-FINANCED Master's program organized by the UMSA Petroleum Engineering Degree
- •All students in this program work in the industry and can pay their tuition

Nº	Las Names	Names	Current Situation
1	ABRUZZESE CASTELLON	GIOVANI JORGE	Working in the industry
2	ALCON TORRE	BENNY	Working in the industry
3	AREQUIPA ARANDA	MARCOS DANIEL	Working in the industry
4	ARGANDOÑA		Working in the industry
	MACHICADO	DAID CLEVER	
5	BUKOVIC SANDOVAL	JOSE LUIS	Working in the industry
6	CARRASCO CARRASCO	GARY	Working in the industry
7	CONALDE TEJERINA	FRANZ CARLOS	Working in the industry
8	CRUZ LLIFUTA	RUBEN DARIO	Working in the industry
9	ESTEVEZ GALARZA	JOAQUIN SANTIAGO	Working in the industry
10	GAMEZ LINARES	JAVIER RONALD	Working in the industry
11	GIRONDA CALLISAYA	JESUS HERNAN	Working in the industry
12	INARRA CAMPOS	ESWIN CARLO	Working in the industry
13	JERIA PANIAGUA	DIEGO IGNACIO	Working in the industry
14	LAURA TORREZ	MIGUEL	Working in the industry
15	LIMACHI ALCON	CARLOS DAVID	Working in the industry
16	LOPEZ MALDONADO	WENSSELL	Working in the industry
17	LOPEZ TORRICO	JUAN GUSTAVO	Working in the industry
18	MORENO MORENO	RODRIGO ALFREDO	Working in the industry
19	PATIÑO ANDRADE	ALEX	Working in the industry
20	PATON JIMENEZ	MAURICIO VICTOR	Working in the industry
21	PEÑARRIETA VINOYA	JORGE AARON	Working in the industry
22	PINAYA SALAZAR	MARCELO	Working in the industry
23	PINTO MACHICADO	CARLOS ANTONIO	Working in the industry
24	POCOMA MAMANI	FRANZ BRUNO	Working in the industry
25	POMA CATACORA	JOSE ANTONIO	Working in the industry
26	QUISPE ARUQUIPA	GROVER JOSE	Working in the industry
27	SANES BARRIOS	EDNAR MISAEL	Working in the industry
28	TICONA SABALETA	ANAHI IRIS	Working in the industry
29	TOUCHARD MENESES	CLAUDIA CECILIA	Working in the industry



2. OPENING OF THE MASTER'S PROGRAM IN RESERVOIR ENGINEERING: EXPLORATION, EVALUATION AND ENVIRONMENT—2nd cycle

DESCRIPCION/DESCRIPTION	No.
Varón /male	25
Mujer/female	20

- This is the second cycle if the current program
- Classes will end in July 2019
- It is estimated that students will graduate until the beginning of 2020.
- Some graduates of the first cycle will be teachers of this and future programs

No.	APELLIDOS	NOMBRES
1	AGUILAR ANDIA	CHANEL
2	ALBERTO CUENTAS	MILTON JESUS
3	ALVAREZ ESCOBAR	ESTEFANY PENIEL
4	APALA RAMIREZ	LESSLY LORENA
5	ARAOZ MENDOZA	MAURICIO
6	AVILA ALAVE	VANESA
7	BALTAZAR MEDINA	DEIVID DAN BISMAR
8	CARAZAS RAMIREZ	DRINA TERESA
9	CASTRO VALDIVIA	VERONICA
10	CHAMBI RAMOS	LUIS GREGORIO
11	COLQUEHUANCA FLORES	IRIAN LETICIA
12	CONDORI CARVAJAL	RONALD OSCAR
13	CONDORI MAMANI	CRISTIAN JHONNY
14	CUELLAR BARRAGAN	HUASCAR GONZALO
15	CUELLAR MENDOZA	ESTEFANI
16	DE LA BARRA VISCAFE	ADRIAN JOSE
17	GALVEZ CLAROS	PAOLA NELLY
18	HEREDIA BELTRAN	RODRIGO OCTAVIO
19	HERRERA VELASCO	CINTIA ARACELI
20	HUANCA COLQUE	RONALD ETSON
21	JEMIO GUTIERREZ	JHESSICA AYLIN
22	LARICO SAAVEDRA	JUAN PABLO
23	LOPEZ ZENTENO	GIOVANA WENDY
24	MENDOZA CUSICANQUI	CAROLINA YOVANA
25	MENDOZA HUANCA	LOURDES
26	PATON ALVARADO	NESTOR CESAR
27	PAUCARA MAMANI	ESTHER VIVIANA
28	PEREZ QUELALI	ALVARO ROBERTO
29	QUENTA BALTAZAR	CLAUDIA JACKELIN
30	QUISBERT RIOS	ANDRES GONZALO
31	QUISBERT SARAVIA	PAMELA DANITZA
32	QUISPE CAMARGO	ELIO VLADIMIR
33	RODRIGUEZ CUEVAS	ISRAEL SANTIAGO
34	SAN MARTIN FLORES	SILVIA PAMELA
35	SANCHEZ ARUQUIPA	JUAN VICTOR
36	SILVA POMA	DANIEL FERNANDO
37	TUDELA ESPEJO	JOSE LUIS
38	VASQUEZ VALENCIA	ALAN RAMIRO
39	VELA MAYTA	ELBA ROSSEMARY
40	VELASCO MUÑOZ	MIRKO FRANCO
41	VISALUQUE MOLLERICONA	MARIA ELENA
42	VISTAS DIAZ	ALVARO
43	YANA MAMANI	JAIME
44	YANARICO RAMOS	MARISELA
45	YUJRA HUANCA	MILTON RODRIGO



3. Services offered to the Industry

A geology laboratory is set up, the same one that is part of the INSTITUTO INGENIERIA PETROLERA

- The offer of this service can be found in the UMSA services guide
- •ITEM has been obtained full-time for a teacher who takes charge of this laboratory. It is intended to do scientific research and provide services to the industry











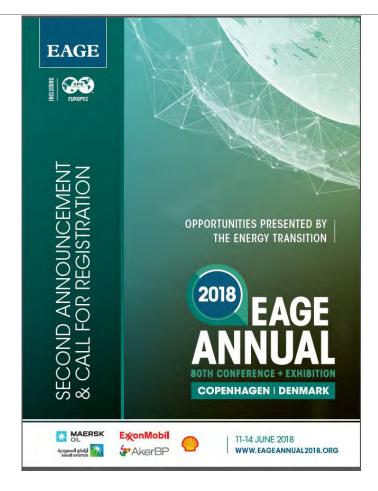
4. CONGRESO DE ISOTOPOS

- T students from our program, with the coordination of the Dr. Udo Zimmermann, participated in the 11th SOUTH AMERICAN SYMPOSIUM ON ISOTOPE GEOLOGY, held between July 22-25, 2018.
- •The 7 students participated in 8 expositions.



5. PARTICIPATION OF 3 STUDENTS in the 2018 EAGE ANNUAL COMPETITION

- Three students from our master's program achieved an 8th place in a major intellectual competition in which representatives of 70 important universities, including Norwegian universities, participated
- They could not attend Copenhagen because of VISA problems





H. IMPACTS OF THE LESSONS LEARNED

BASICALLY THE STUDY IS CENTERED IN THE AREAS OF RESERVOIR ENGINEERING, GEOLOGY AND IMPROVED HYDROCARBON RECOVERY. The new magister have the following acquired skills:

- •How to perform fieldwork, the appropriate recognition of rocks.
- How to take rock samples and describe the same
- The study of the evolution of sedimentary structures
- Application of well logs and how to use them in the calculation of petrophysical properties
- Seismic interpretation of a structure
- Create maps with the use of geographic systems
- Analyze basins, evaluation of prospects, bedrock, seal rock, reservoir and fluid migration
- Dating of zircons
- Use of laboratory equipment (microscopes, cutting machines and rock pulisher)

