Universidad Tecnológica de Pereira
Faculty of Business Science

Master's Degree in
Operational Research and Statistics

Master's Degree in Operational Research and Statistics

Universidad Tecnológica de Pereira
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MASTER'S DEGREE IN Operational Research and Statistics

European Accreditation of Engineering Programmes
EUR-ACE®

Renewal of qualified Registry for 7 years, according to resolution No, 08020 of May 24 2018

High Quality Accreditation: Resolution Number 015864 of August 25, 2021 valid until 2027.

Universidad Tecnológica de Pereira
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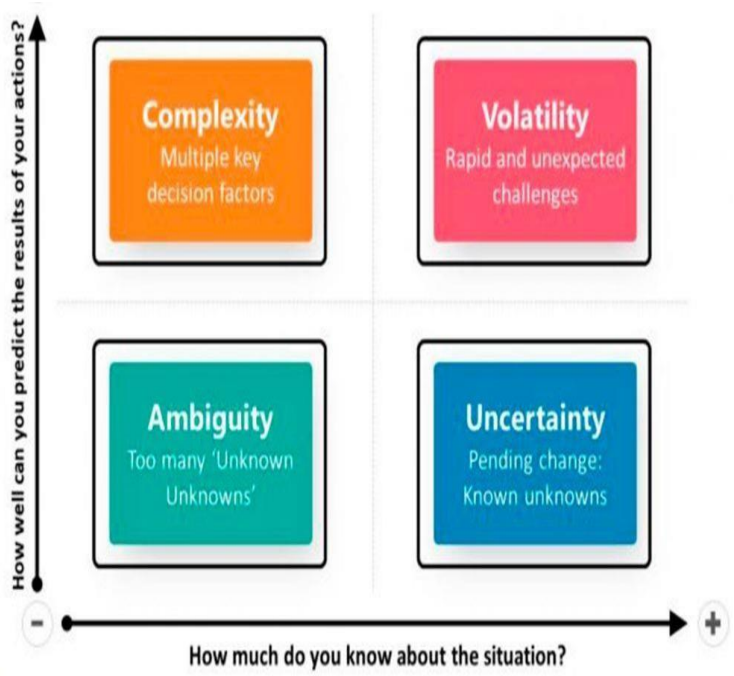
Agenda

1. Enviromental VUCA
   Supply chain disruptions, current market trends.
2. Institucional development plan.
3. Academic relationship
4. Research groups (Internal and external)
5. External Network
6. Research and Knowledge Flow
7. Program Objectives
8. Learning results
9. Assement plan

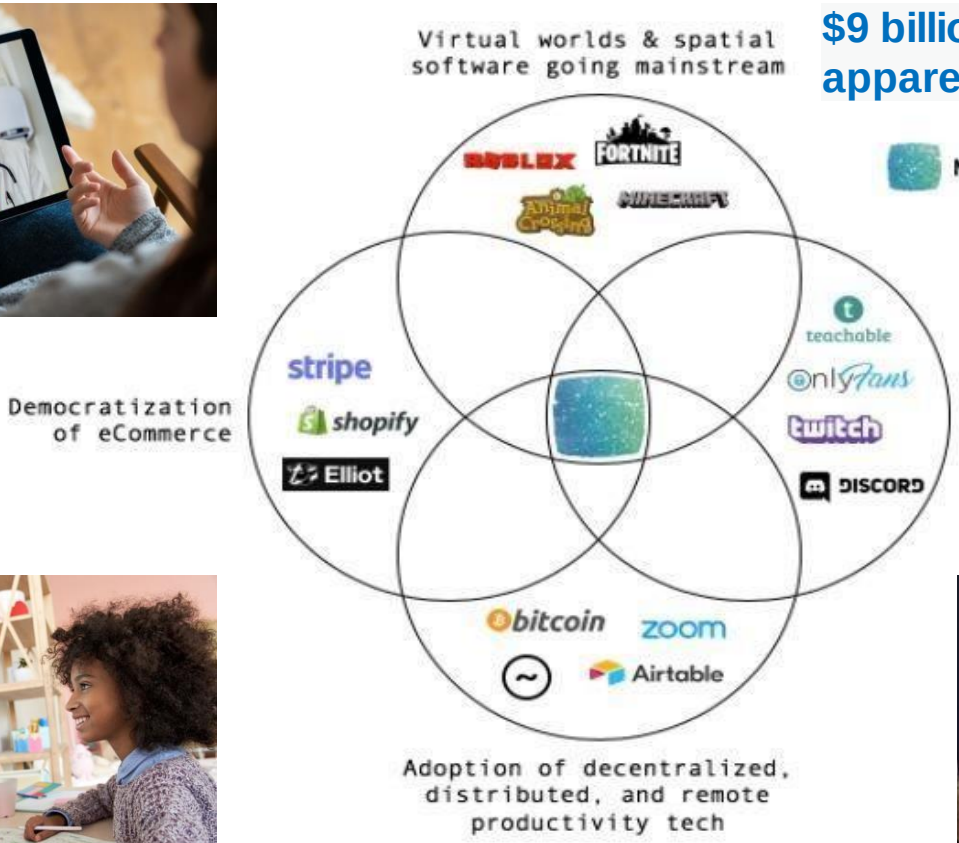
Diseño: Recursos Informáticos y Educativos CIRE Tel: (0 313 7140

1. Volatility, Uncertainty, Complexity and Ambiguity. (VUCA)



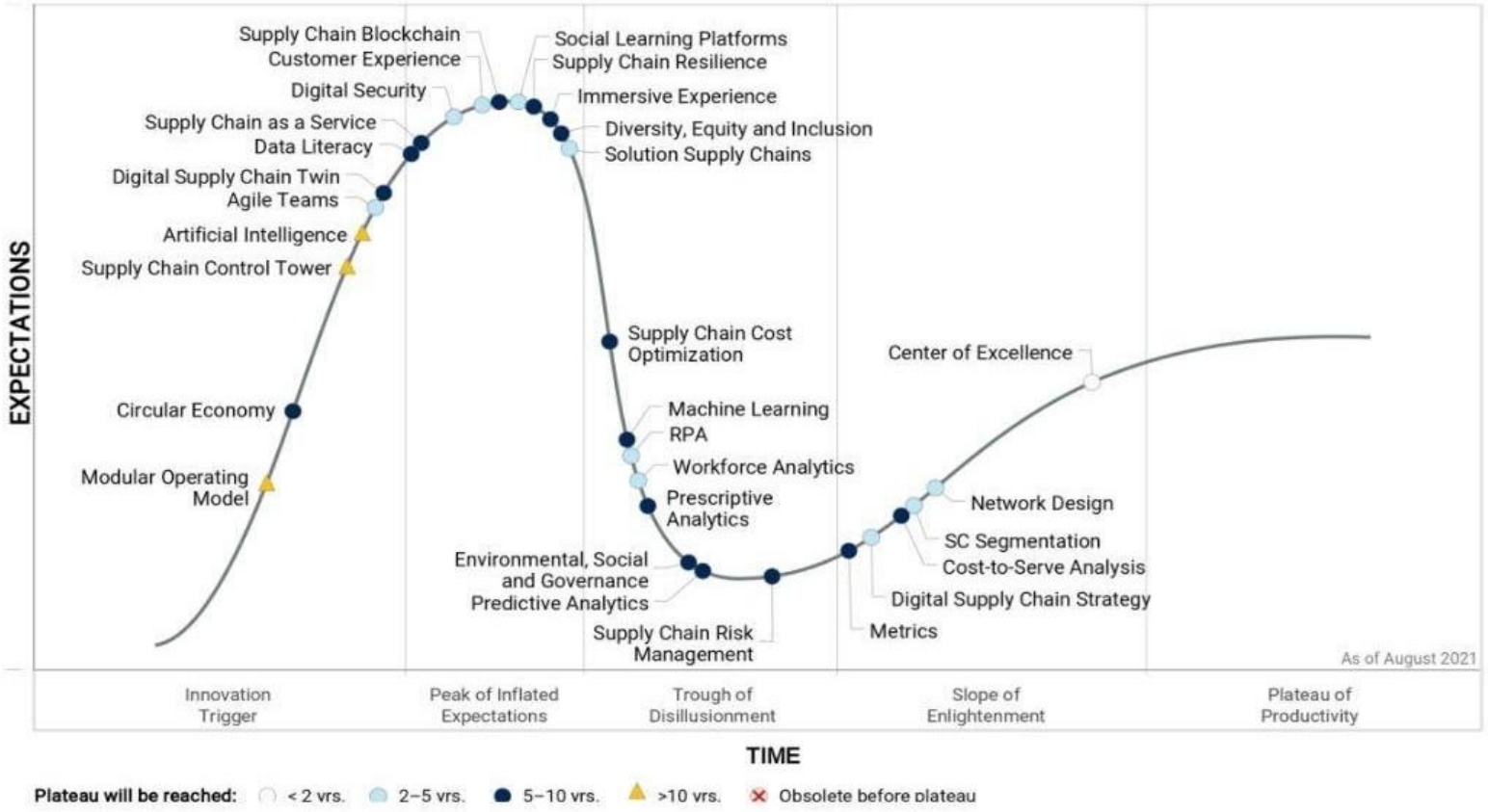
1. Supply chain disruptions

1. Current Market trends



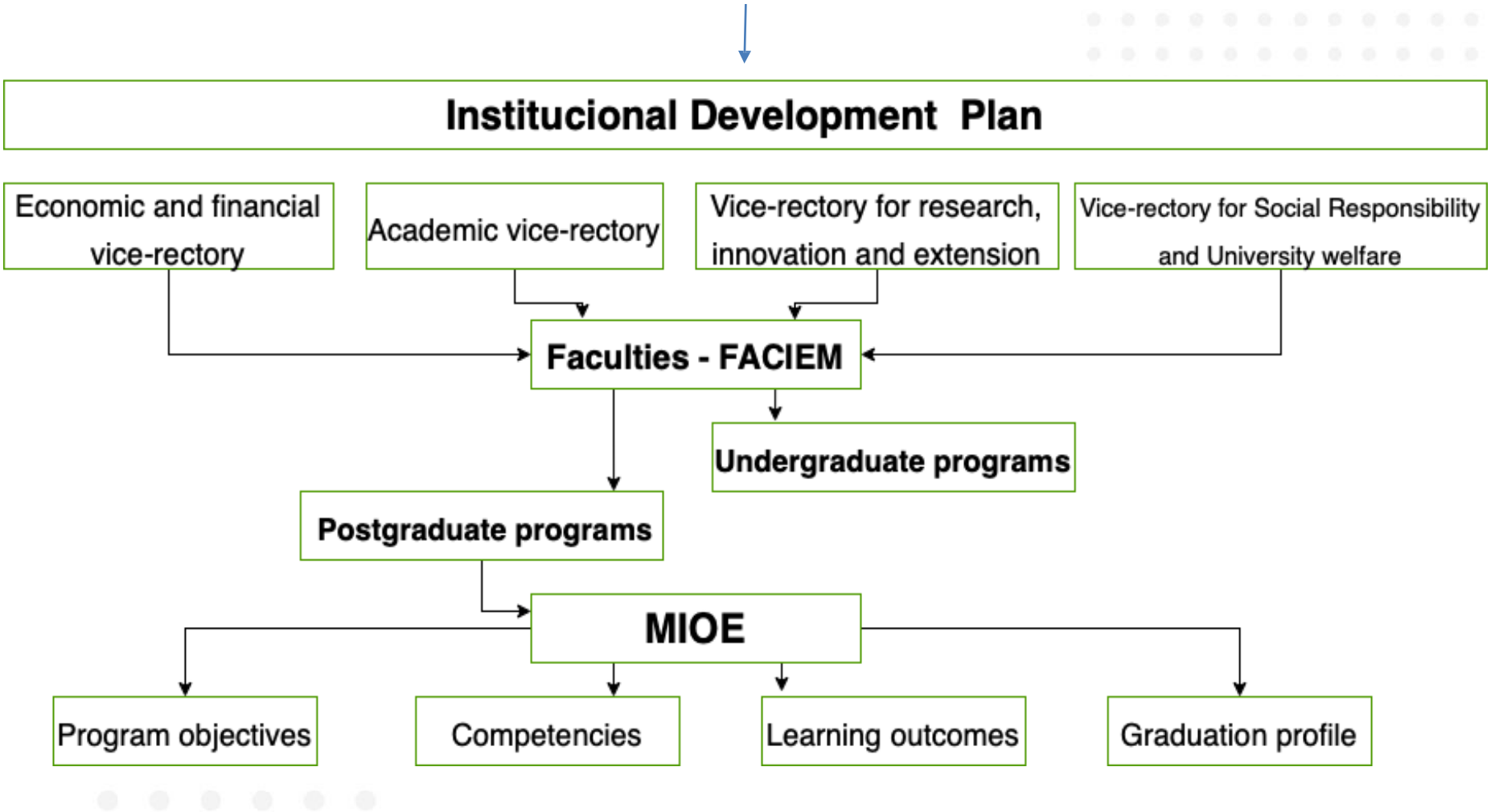
$9 billion in digital apparel sales

1. Hype Cycle Supply Chain Strategy, 2021



Source: Gartner (August 2021)

748305


Institucional Development Plan
Economic and financial vice-rectory
Academic vice-rectory
Vice-rectory for research, innovation and extension
Vice-rectory for Social Responsibility and University welfare
Faculties - FACIEM
Undergraduate programs
Postgraduate programs
MIOE
Program objectives
Competencies
Learning outcomes
Graduation profile

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3. Academic relationship

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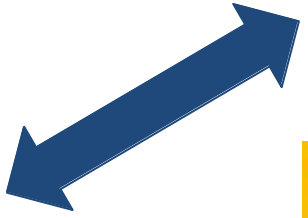
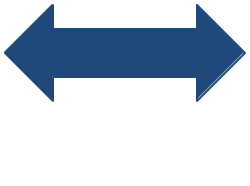


PhD studies

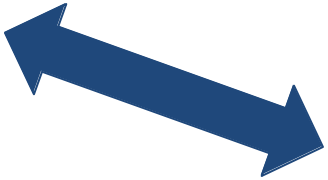
Universidad Tecnológica de Pereira — Doctorado en Ingenieria

Universidad Tecnológica de Pereira — Maestría en Administración Económica y Financiera



Universidad Tecnológica de Pereira — Maestría en Ingenieria Eléctrica

MASTER studies



Undergraduate studies

Universidad Tecnológica de Pereira — Ingeniería Industrial

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4. Research groups

Business Science

Grupo de Investigación GEIO
Facultad de Ciencias Empresariales

Grupo en aplicaciones en Optimización y Procesos Estocásticos

Study and application of modern statistical tools in the solution of probabilities of the environment

Human and organizational development group

Electrical, electronics and computer science engineering

Grupo de Investigación Planeamiento de Sistemas Eléctricos

Grupo DINOP

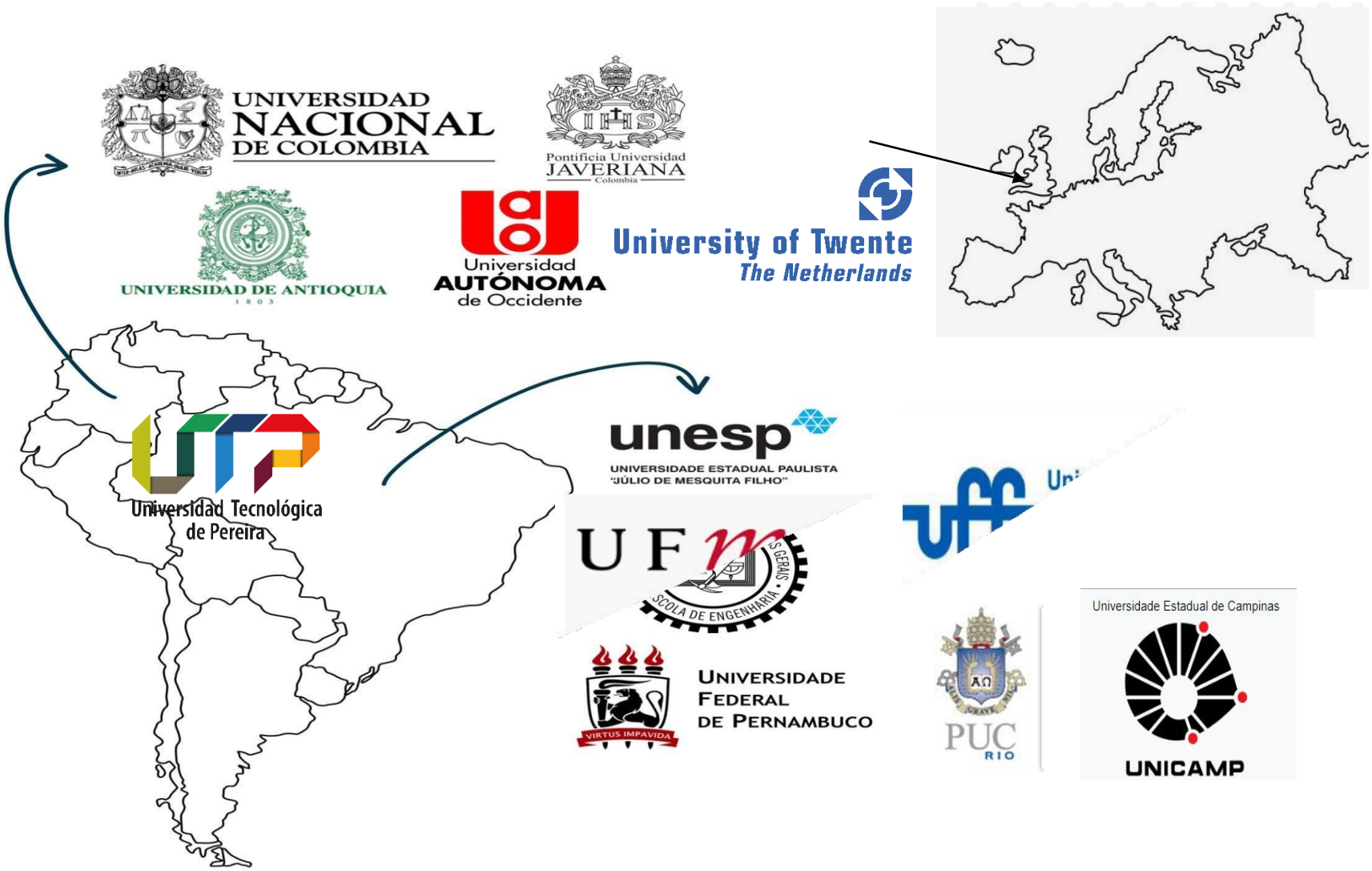
DATA ENVELOPMENT ANALYSIS

GIMPRO business productive improvement

UFMG GOPAC

LaPSEE

5. External Networks



6. Research and Knowledge flow

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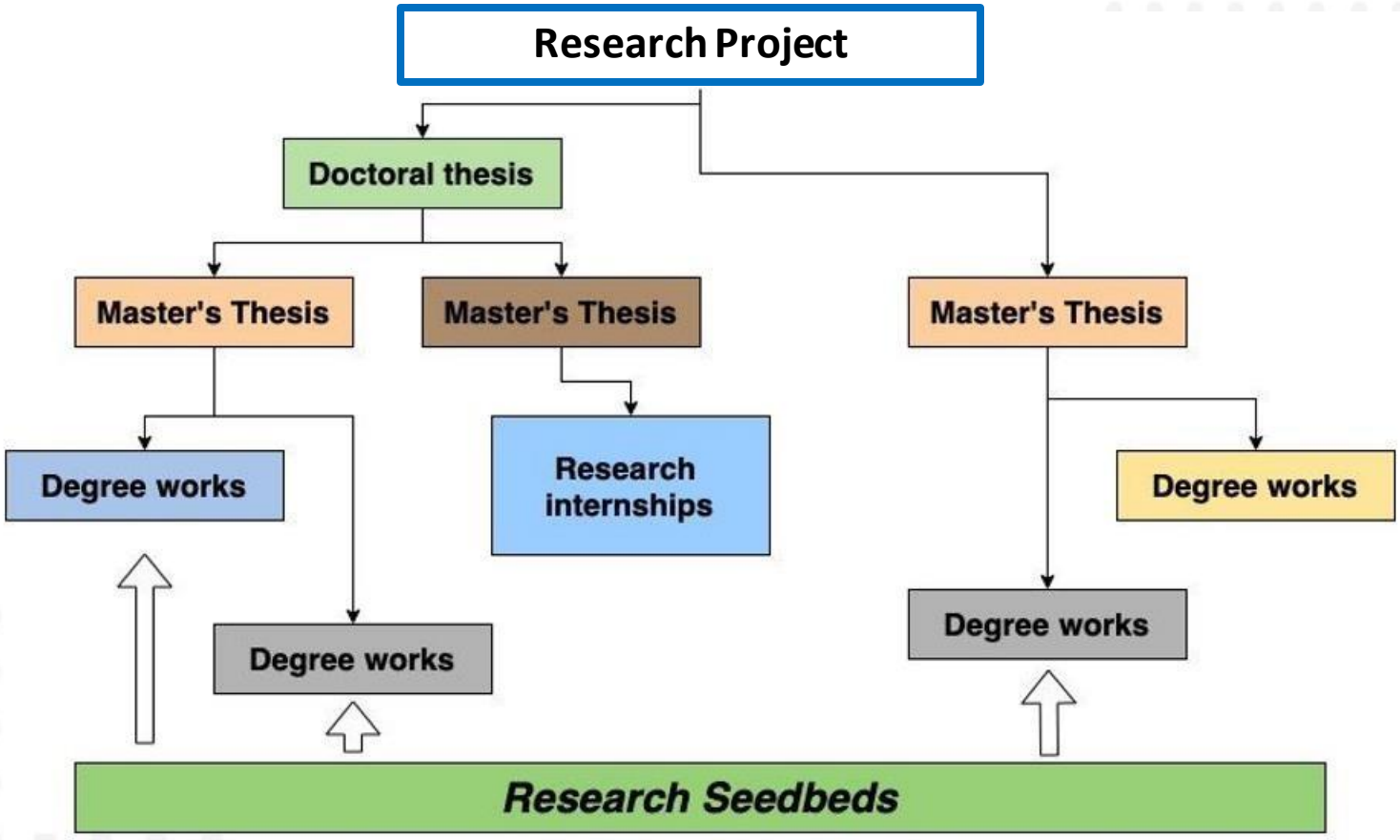

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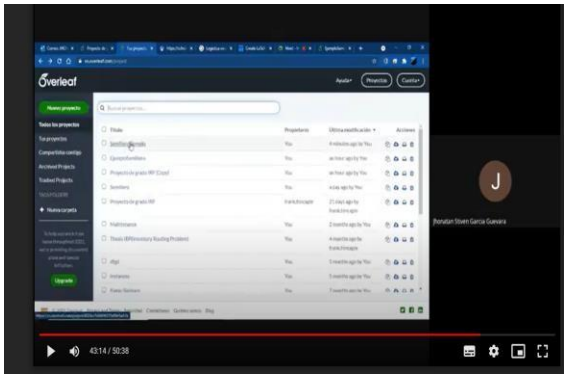
Syncronic meetings with experts



- Phyton
-A mathematical model programming
- Machine learning
- Humanitarian logistic
- Last mile logistic
- Distribution logistic
- Scheduling
- Packing
- Matlab

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Syncronic meetings with experts

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Alejandro Ospina Castaño.
Ingeniero Electricista.
Joven investigador UTP

Daniela Ospina Toro

Lecturer, Universidad Tecnológica de Pereira
Dirección de correo verificada de utp.edu.co
Computational Neuroscience Transportation Sciences Logistics

Maria Nataly Bañol Arias

University of Campinas (UNICAMP), Department of Energy Systems, School of Electrical and Computer
Dirección de correo verificada de dsee.fee.unicamp.br
Power Systems Distribution Networks Electric Vehicles Smart Grids Distributed Energy Resources

Jose Daniel Mosquera-Artamonov

Universidad Autónoma de Nuevo León
Dirección de correo verificada de uanl.edu.mx

Jaime Andres Cardona Arias

Endereço para acessar este CV: http://lattes.cnpq.br/9510193945229430
ID Lattes: **9510193945229430**
Última atualização do currículo em 14/03/2020

Luis Fernando Galindres

phd Student
Verified email at utp.edu.co
vehicle routing metaheuristics multi-objective optimization

John Fredy Franco

São Paulo State University (UNESP), Rosana, Brazil
Dirección de correo verificada de unesp.br
Power Systems Distribution Networks Smart Grids Distributed Energ

Juan Sebastian Arias
Msc: en IOE UTP

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Syncronic meetings with experts

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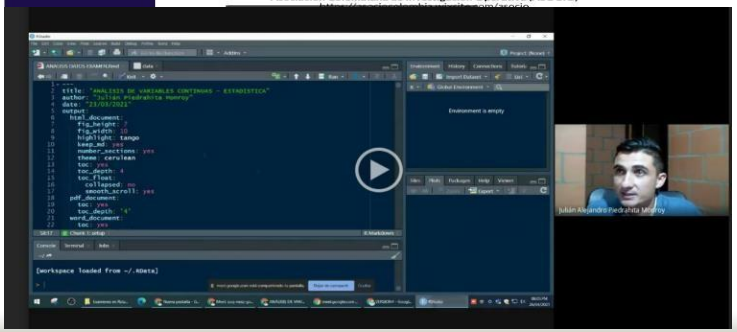

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Papers in academic journals

Master's Degree in
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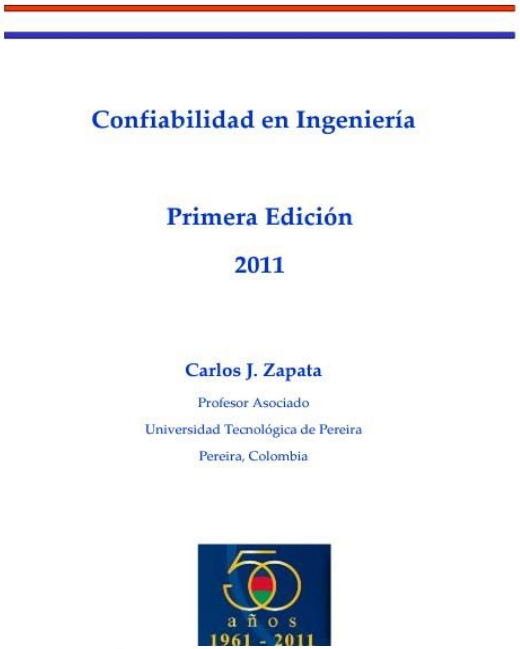
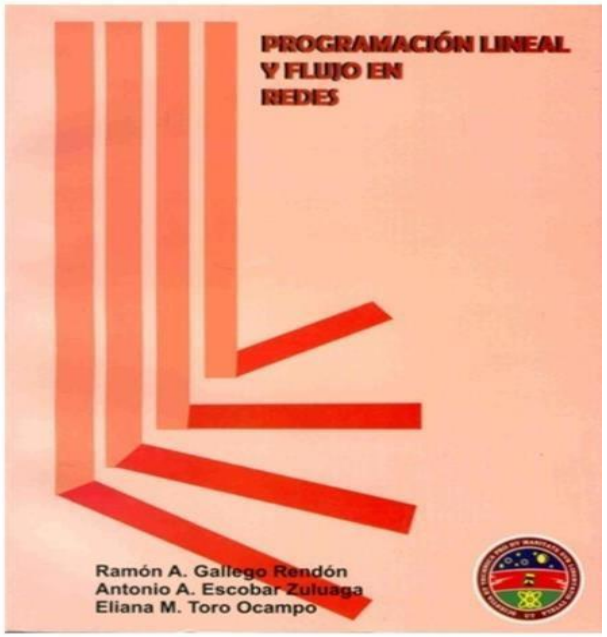
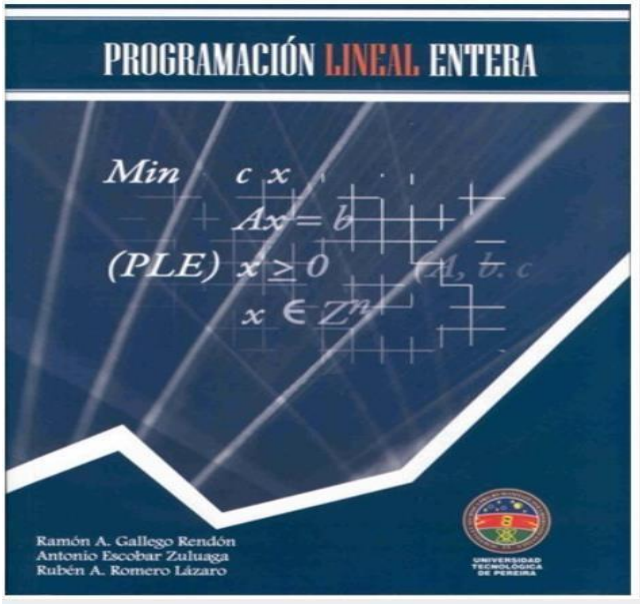
Master's Degree in
Operational Research and Statistics

Book´s developed by our teachers







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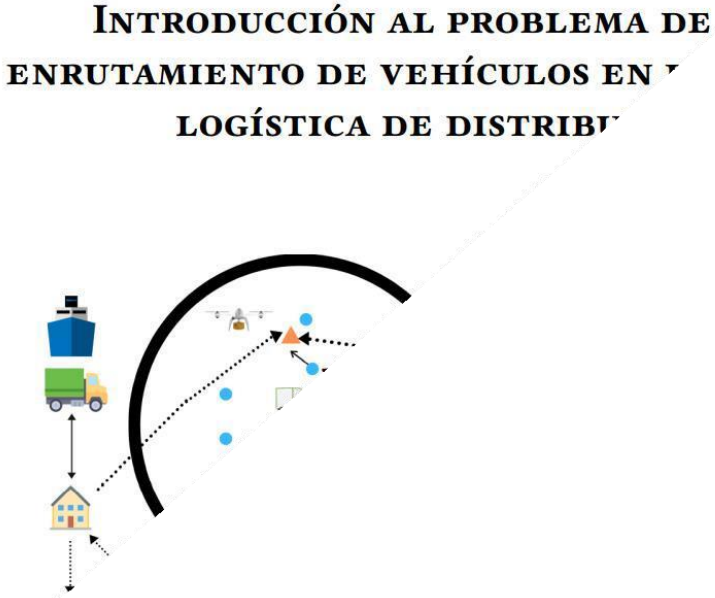
Book´s developed by our teachers



http://doi.org/10.22517/9789587224818

7. Program Objectives

OP1. Offer interested professionals deepening their training in order to lead research processes and the application of Operations Research and Statistics techniques, on the fronts of Engineering and academia.

OP2. Present the ways to optimize the use of the resources that the company uses to make it more competitive, applying models and tools of operations research and statistics.

OP3. Present multivariate qualitative and quantitative statistics aimed at supporting decision-making in the fields of engineering, taking into account the global context of society.
techniques

OP4. Promote research on topics related to operations research techniques and statistics, taking into account ethical, moral and scientific rigor.

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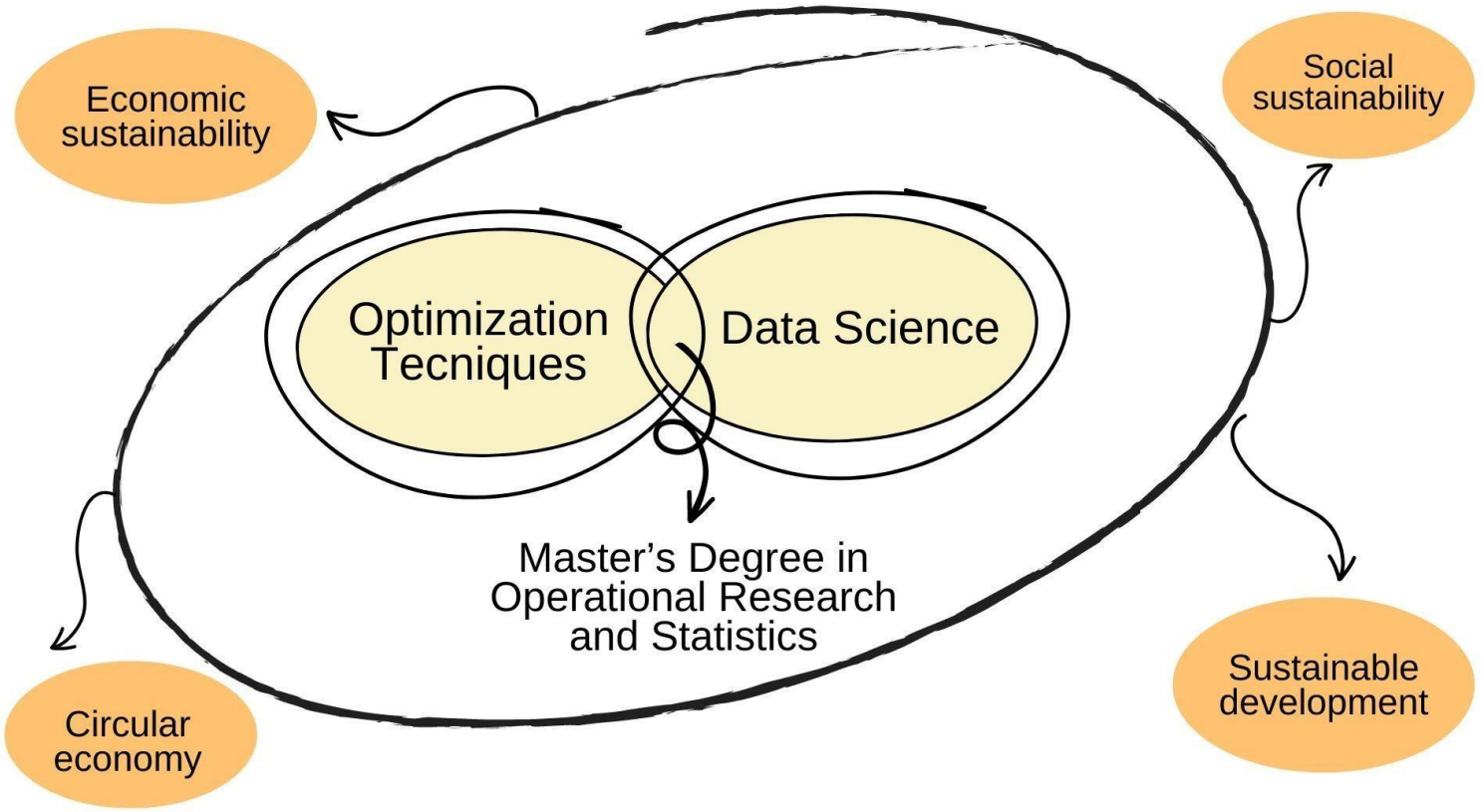
Learning results

Categorization learning results	
Learning results (RAP)	**Level**
RAP 1	Understanding level
RAP 2	Analysis level
RAP 3 **RAP 4** **RAP 10**	Application level
RAP 5	Synthesis and Evaluation level
RAP 7	Evaluation level
RAP 8 **RAP 9**	Synthesis level

Graduate Profile



Graduate Profile

- Analyze and solve engineering problems
- Personal skills and attitudes
- Professional skills and attitudes
- multidisciplinary work
- Effective communication
- Communication in foreign languages (English)
- External and social context

+

Experimentation and discovery of knowledge	=	Researcher
Systemic thinking Systems design and engineering	=	System designer
Design Implementation	=	Process designer device
Operation	=	Product process support or operations engineer
Companies and commercial context	=	Business engineer or manager

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Universities where our graduates work

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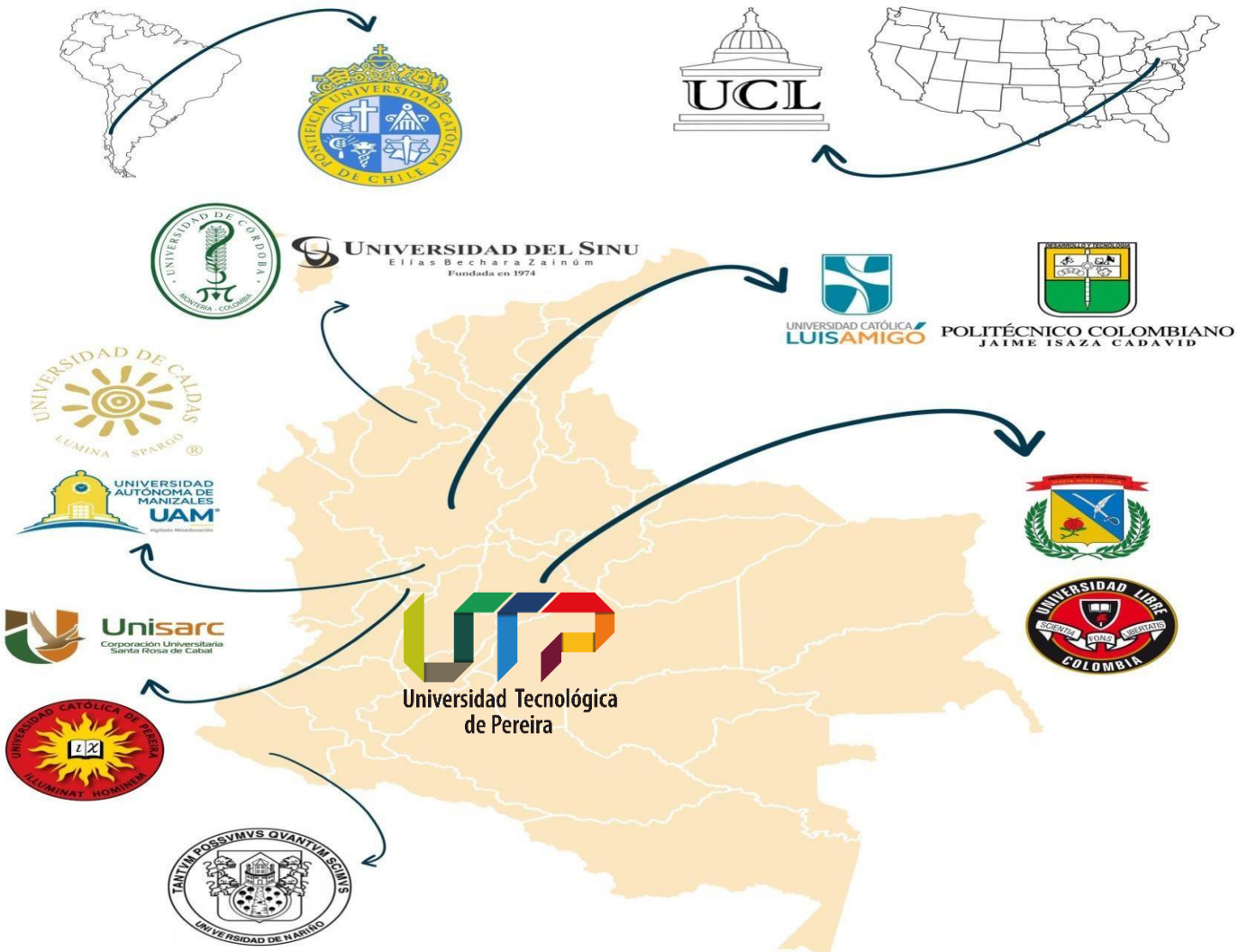

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Some graduates publications

Uncertain Supply Chain Management

ISSN 2291-6830 (Online) - ISSN 2291-6822 (Print)
Quarterly Publication
Volume 7 Issue 4 pp. 767-782 , 2019

Design of a supply chain to produce ethanol from one residuum and two coffee by-products *Pages 767-782*
Download PDF

Authors: Mónica Y. Castro-Peña, César Augusto Peñuela, Julián Gil González

http://growingscience.com/beta/uscm/3268-design-of-a-supply-chain-to-produce-ethanol-from-one-residuum-and-two-coffee-by-products.html

UNIVERSIDAD NACIONAL DE COLOMBIA
SEDE MEDELLÍN
FACULTAD DE MINAS

DYNA
http://dyna.medellin.unal.edu.co/

Assessing the efficiency of science, technology and innovation using Data Envelopment Analysis (DEA): The case of Colombia

Daniel Aristizábal-Torres [a], Mónica Yuleni Castro-Peña [b], Paola Andrea Echeverri-Gutiérrez [c] & Jesús David Valencia-Salazar [c]

[a] Centro de Investigaciones, Universidad Libre Seccional Pereira, Pereira, Colombia. daristizabal@unilibrepereira.edu.co
[b] Universidad Católica de Pereira, Pereira, Colombia. monica.castro@ucp.edu.co
[c] Facultad de Ingeniería, Universidad Libre Seccional Pereira, Pereira, Colombia. paecheverri@unilibrepereira.edu.co, jdvalencia@unilibrepereira.edu.co

Chromeextension://efaidnbmnnnibpcajpcglclefindmkaj/http://www.scielo.org.co/pdf/dyna/v84n202/0012-7353-dyna-84-202-00215.pdf

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Some graduates publications

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DISEÑO DE REDES DE LOGÍSTICA INVERSA: UNA REVISIÓN DEL ESTADO DEL ARTE Y APLICACIÓN PRÁCTICA

A NETWORK DESIGN FOR A REVERSE LOGISTICS: A REVIEW AND A PRACTICAL APPLICATION

Luz Ángela Flórez Calderón
Ing. Industrial, Investigadora, Universidad Tecnológica de Pereira, Pereira, Colombia
laflorez@utp.edu.co

http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0124-81702012000200009

Localización, transporte e inventarios

Tres decisiones estructurales en el diseño de cadenas de abastecimiento

William Ariel Sarache Castro
Marcela María Morales Chávez

https://www.tandfonline.com/doi/full/10.1080/0305215X.2019.1681985

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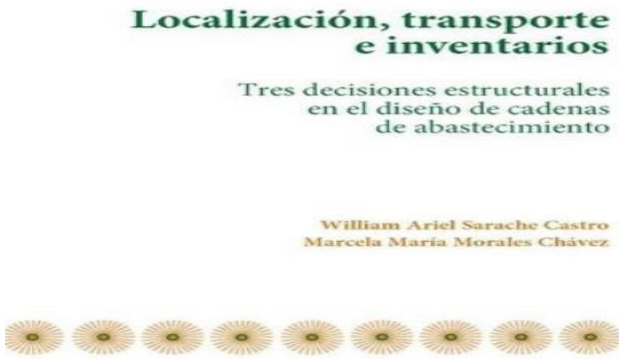
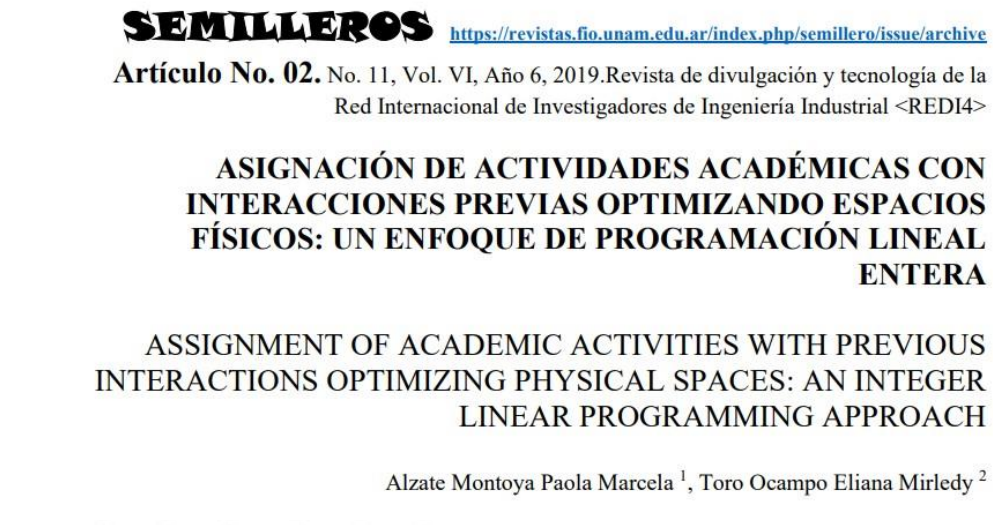
Some graduates publications


Localización, transporte e inventarios

Tres decisiones estructurales en el diseño de cadenas de abastecimiento

William Ariel Sarache Castro
Marcela María Morales Chávez

https://libreriasiglo.com/administracion/38764-localizacion-transporte-e-inventarios.html


SEMILLEROS https://revistas.fio.unam.edu.ar/index.php/semillero/issue/archive

Artículo No. 02. No. 11, Vol. VI, Año 6, 2019.Revista de divulgación y tecnología de la Red Internacional de Investigadores de Ingeniería Industrial <REDI4>

ASIGNACIÓN DE ACTIVIDADES ACADÉMICAS CON INTERACCIONES PREVIAS OPTIMIZANDO ESPACIOS FÍSICOS: UN ENFOQUE DE PROGRAMACIÓN LINEAL ENTERA

ASSIGNMENT OF ACADEMIC ACTIVITIES WITH PREVIOUS INTERACTIONS OPTIMIZING PHYSICAL SPACES: AN INTEGER LINEAR PROGRAMMING APPROACH

Alzate Montoya Paola Marcela [1], Toro Ocampo Eliana Mirledy [2]

https://revistas.fio.unam.edu.ar/index.php/semillero/issue/archive

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Some graduates publications

Revista EIA, ISSN 1794-1237 / Año XIII / Volumen 13 / Edición N.26 / Julio-Diciembre 2016 / pp. 141-152
Publicación semestral de carácter técnico-científico / Universidad EIA, Envigado (Colombia)

ASIGNACIÓN DE FRECUENCIAS APROPIADAS A TRAVÉS DE UN MODELO MULTIOBJETIVO PARA UN SISTEMA BRT

DIEGO ARMANDO GALINDRES GUANCHA[1]
JOSE ADALBERTO SOTO MEJÍA[2]
SANDRA ESTRADA MEJÍA[3]

RESUMEN

https://www.researchgate.net/publication/317150758_ASIGNACION_DE_FRECUENCIAS_OPTIMAS_A_TRAVES_DE_UN_MODELO_MULTIOBJETIVO_PARA_UN_SISTEMA_BRT

https://ieeexplore.ieee.org/document/6336683

Article

APPROPRIATE FREQUENCY ALLOCATION FOR A BRT SYSTEM THROUGH A MULTIOBJECTIVE MODEL

December 2016 · Revista EIA
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Diego Armando Galindres Guancha · Jose Adalberto Soto Mejía · Sandra Estrada Mejía

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Some graduates publications

https://ieeexplore.ieee.org/document/7795727

https://ar.linkedin.com/in/paula-andrea-alzate-ramirez-35002815

UNIVERSIDAD CATÓLICA LUIS AMIGÓ

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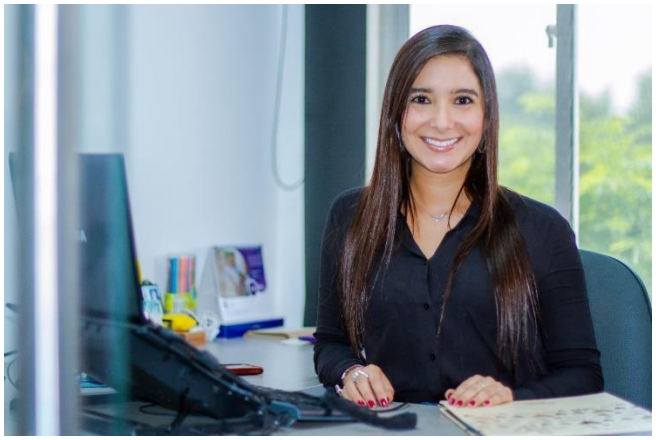
Some graduates and their jobs



Maria Paula Moreno Jaramillo
Jefe de Estándares - Audifarma

Carlos Alberto Tabares Marín
Coordinador de costos
Audifarma

Alexander Zapata Salguero
Coordinador de Listas de precios- Audifarma

Rigoberto Cortés
Laboratorio de Aguas y Aguas de Pereira

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Some graduates and their jobs

Operational Research and Statistics

Forest Engineer
FORESTRY DEPARTMEN

Smurfit Kappa

Mónica Castro Peña

https://www.researchgate.net/profile/Monica-Castro-Pena

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ILLUMINAT HOMINEM

Marcela María Morales Chavez

https://www.researchgate.net/profile/Marcela-Morales-Chavez

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Some graduates and their jobs

Laura Angelica Mejía Ospina

Universidad Autónoma de Occidente

https://scholar.google.cl/citations?user=3j2dPZMAAAAJ&hl=en

David Alejandro Jiménez Osorio.

Ingeniero de proyectos - Transconsult Colombia.

https://www.transconsult.com/

https://co.linkedin.com/in/david-alejandro-jimenez-osorio-46555578

Orlando Sabogal Cardona
Interamerican development bank

https://co.linkedin.com/in/orlando-sabogal-48677034

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Companies where our students and graduates work

Sugar mill

Ingenio Carmelita
Hecho con el corazón

Ingenio Risaralda
Lo hacemos posible

Energy sector

edeq Grupo·epm

ecopetrol

chec Grupo·epm

Food industry

Frisby

Postobón

Data Science

Cluvi

Transconsult

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Companies where our students and graduates work

Packaging and paper

Smurfit Kappa

PAPELES NACIONALES S.A.
PANASA

Governmental

BID
Banco Interamericano de Desarrollo

FISCALIA
GENERAL DE LA NACION

SENA

Health and medicine sector

AUDIFARMA

Comfamiliar
RISARALDA

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Next event development by our program

Primer Simposio en Ciencia de datos UTP

Ponentes

- **Adriana María Santa Alvarado**

MsC. En Investigación de Operaciones y Estadística.

- **David Alejandro Jiménez Osorio**

MsC. En Investigación de Operaciones y Estadística

- **Juan Sebastián Arias Hernández**

MsC. En Investigación de Operaciones y Estadística

- **Délany Ramírez del Río**

MsC. En Investigación de Operaciones y Estadística.

- **Julián Piedrahita Monroy**

MsC. En Desarrollo Agroindustrial

Universidad Tecnológica de Pereira | Facultad de Ciencias Empresariales | Maestría en Investigación Operativa y Estadística | Laboratorio Financiero | GAOPE | Maestría en Ingeniería de Sistemas y Computación | Facultad de Ingenierías | Grupo de Investigación SIRIUS

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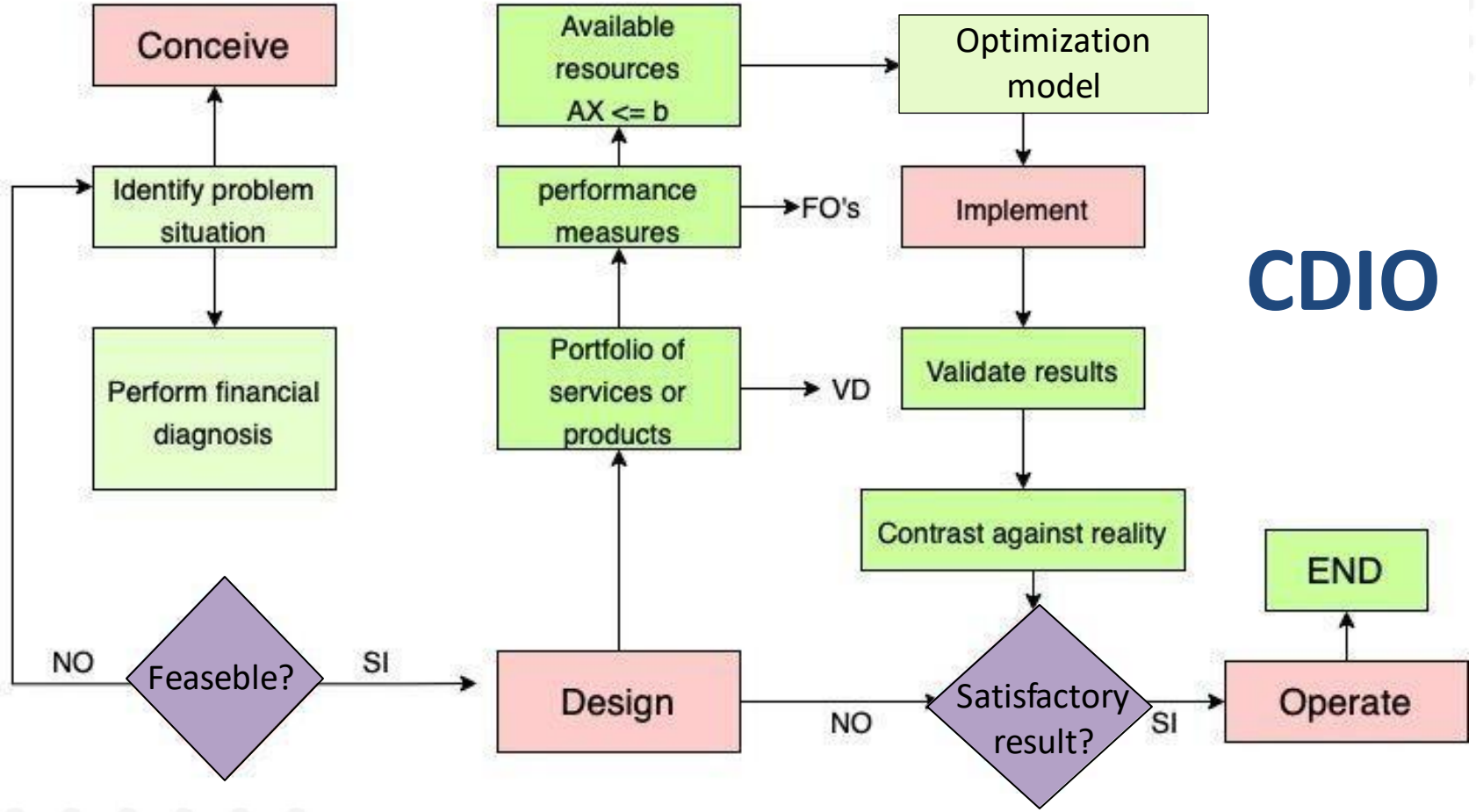
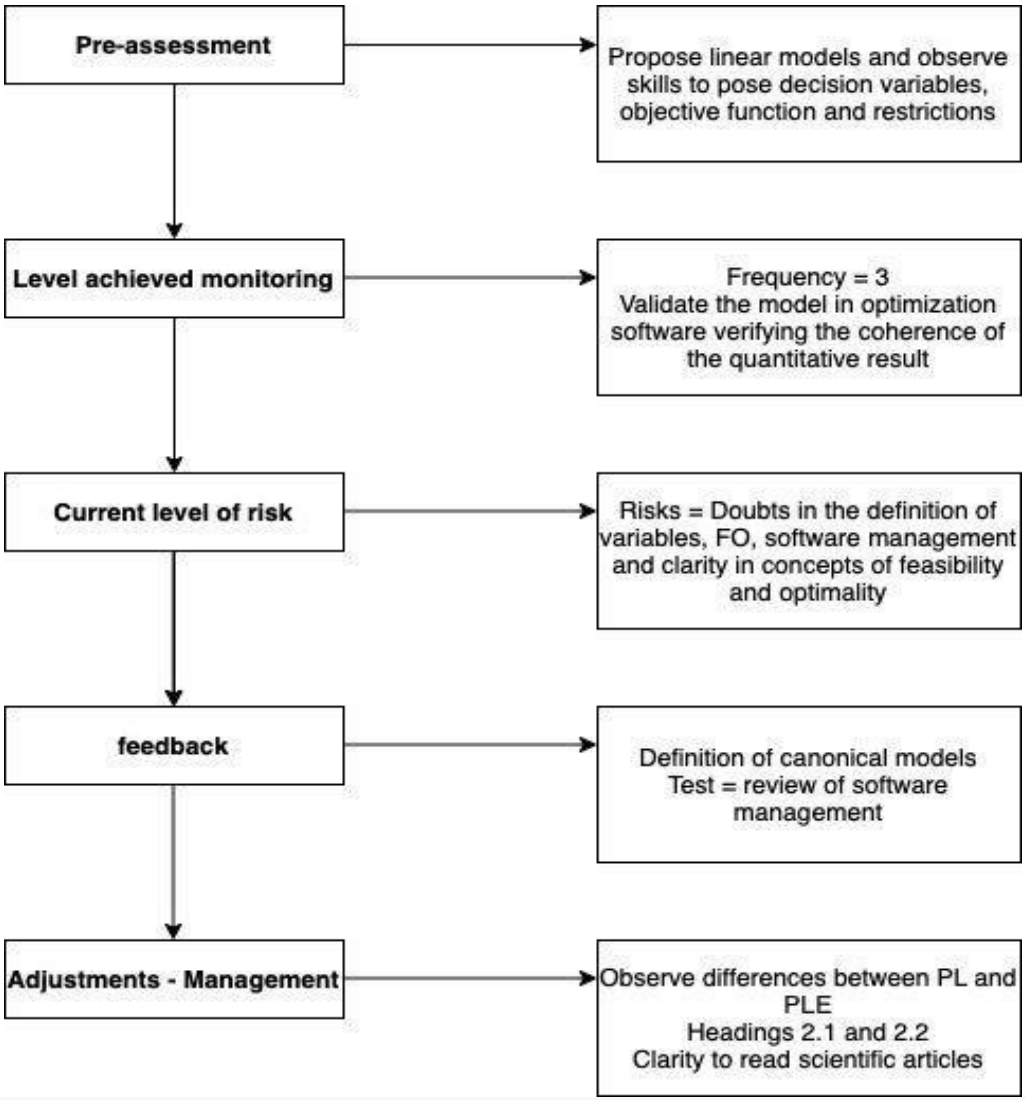
Plan Assessment

Project that forces students to involve the external sector

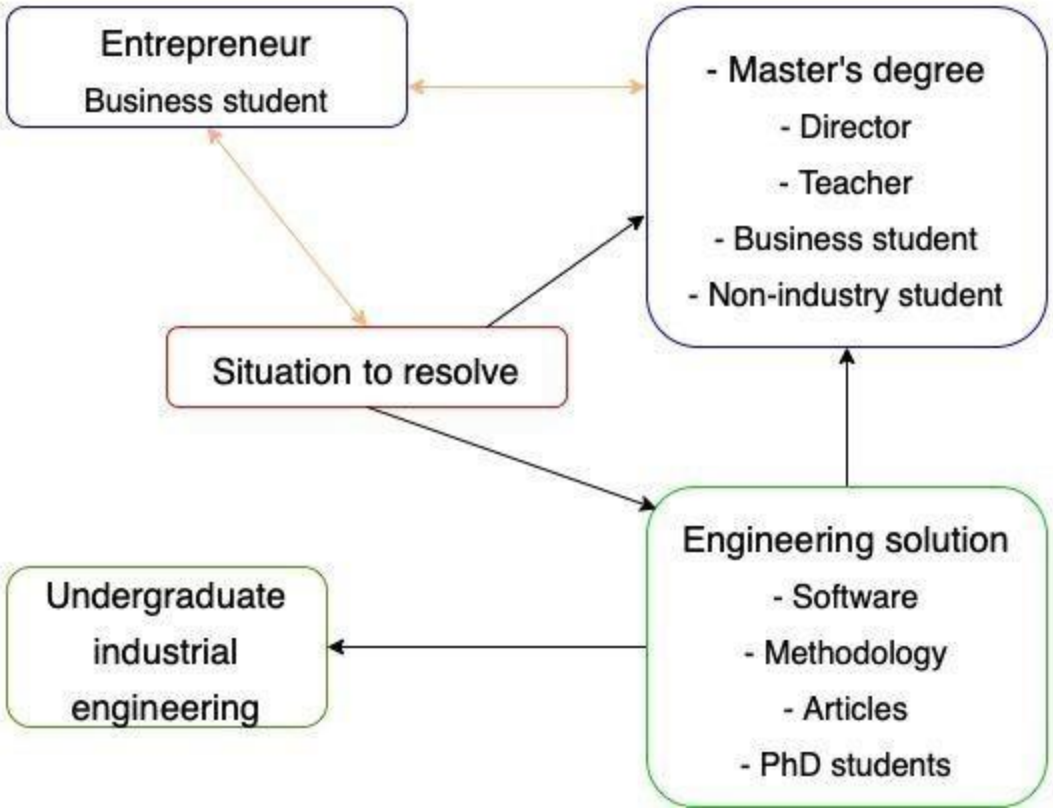


CDIO



Complete description of the monitoring and evaluation of the learning results of their subjects.

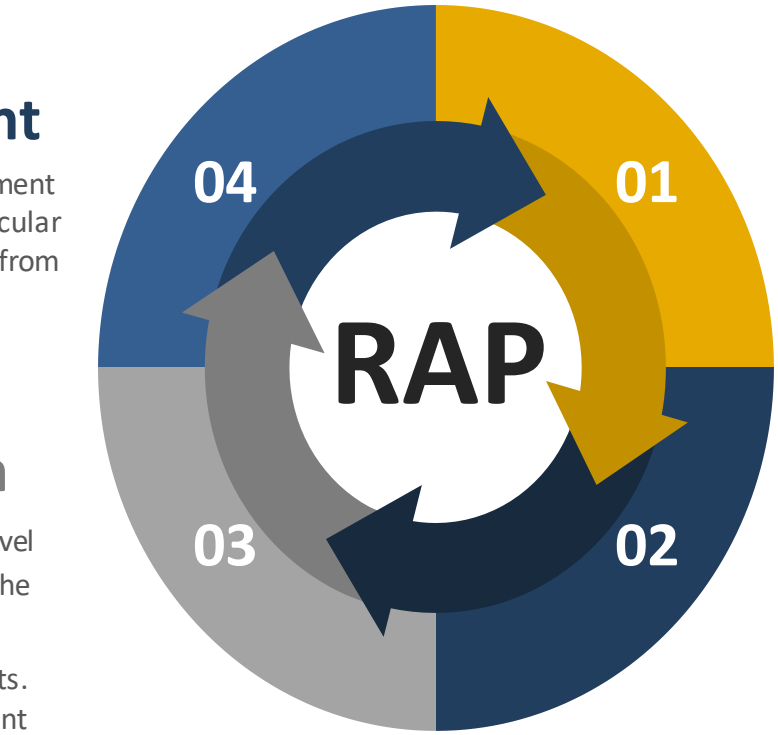
Methodology that integrates the subjects with each other and guides them to the fulfillment of the strategic direction, for a learning result



Proposal for Monitoring and Evaluation of Learning Results

Improvement

- Implement improvement actions or curricular adjustments derived from the evaluation.



Plan de assessment

- Indicators of performance.
- Assessment sources.
- Evaluation instrument.
- Assessment method.
- Time.

Evaluation

- Calculation of the level of achievement of the RA.
- Analysis of the results.
- Program improvement plan.

Assessment

- Preparation of rubrics.
- Information gathering.

Formulate and/or update: Purpose, objectives, competencies, RAP, entry, graduation and professional profile of the students

Program Training Areas	Courses according to training area	Program learning outcomes (RAP) associated with the training area	Learning outcome (RAP) evaluated according to training area
Operations Research Area	▪ Operations Research Leveling ▪ Simulation of system dynamics ▪ Advanced Linear Programming ▪ nonlinear programming ▪ Metaheuristics ▪ Data Envelopment Analysis (DEA) ▪ Financial optimization	**RAP_1** **RAP_4** **RAP_7** **RAP_10** **RAP_11** **RAP_12**	**RAP_1**
Statistics Area	· Multivariate analysis ▪ Categorical Data Analysis ▪ Regression and Time Series ▪ Stochastic processes ▪ Data mining	**RAP_2** **RAP_4** **RAP_5** **RAP_10** **RAP_12**	**RAP_2**
Research Area (app)	▪ Degree work I (thesis I) ▪ Grade II work (thesis II)	**RAP_3** **RAP_4** **RAP_5** **RAP_6** **RAP_8** **RAP_9** **RAP_10** **RAP_11** **RAP_12**	**RAP_3 y RAP_6**

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Thank you!

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