DE HOMO ECONOMICUS

2ST MASTER BUSINESS ENGINEERING (HIR)

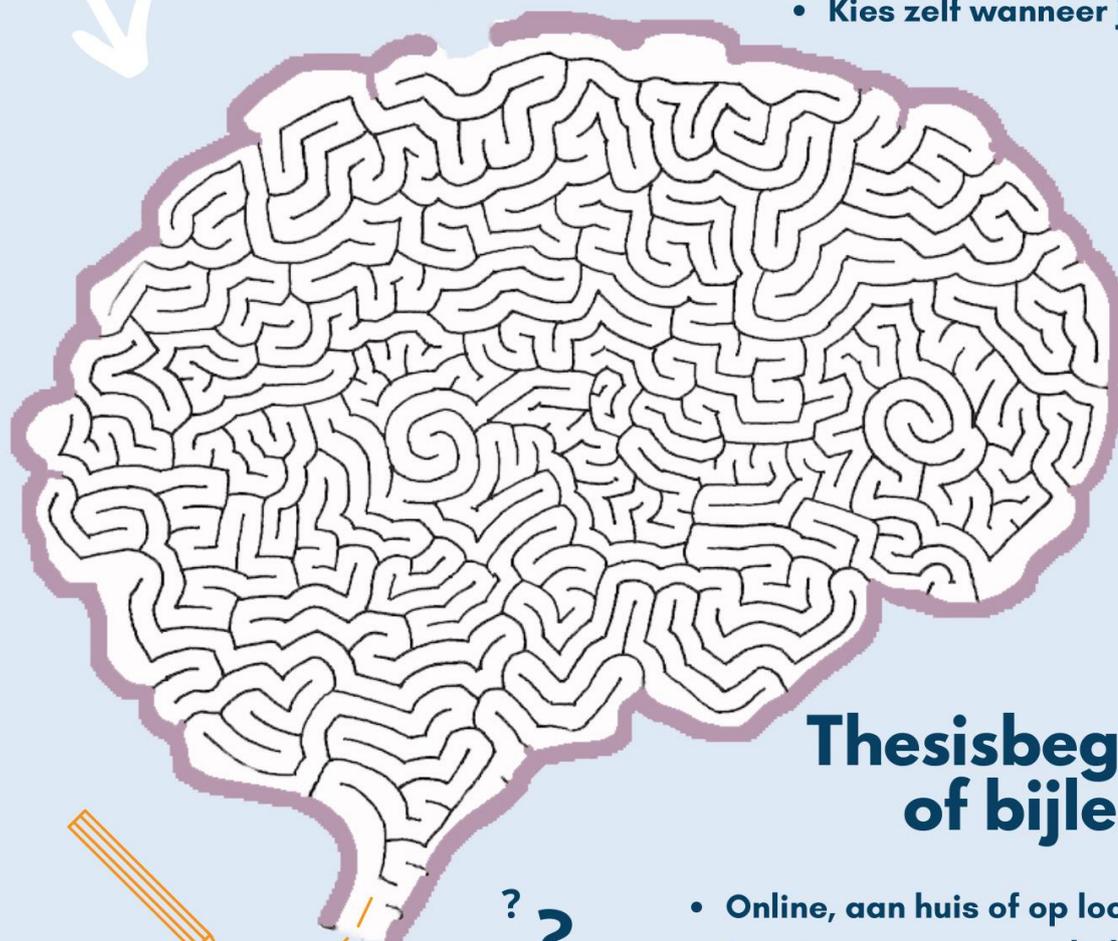2020-2021
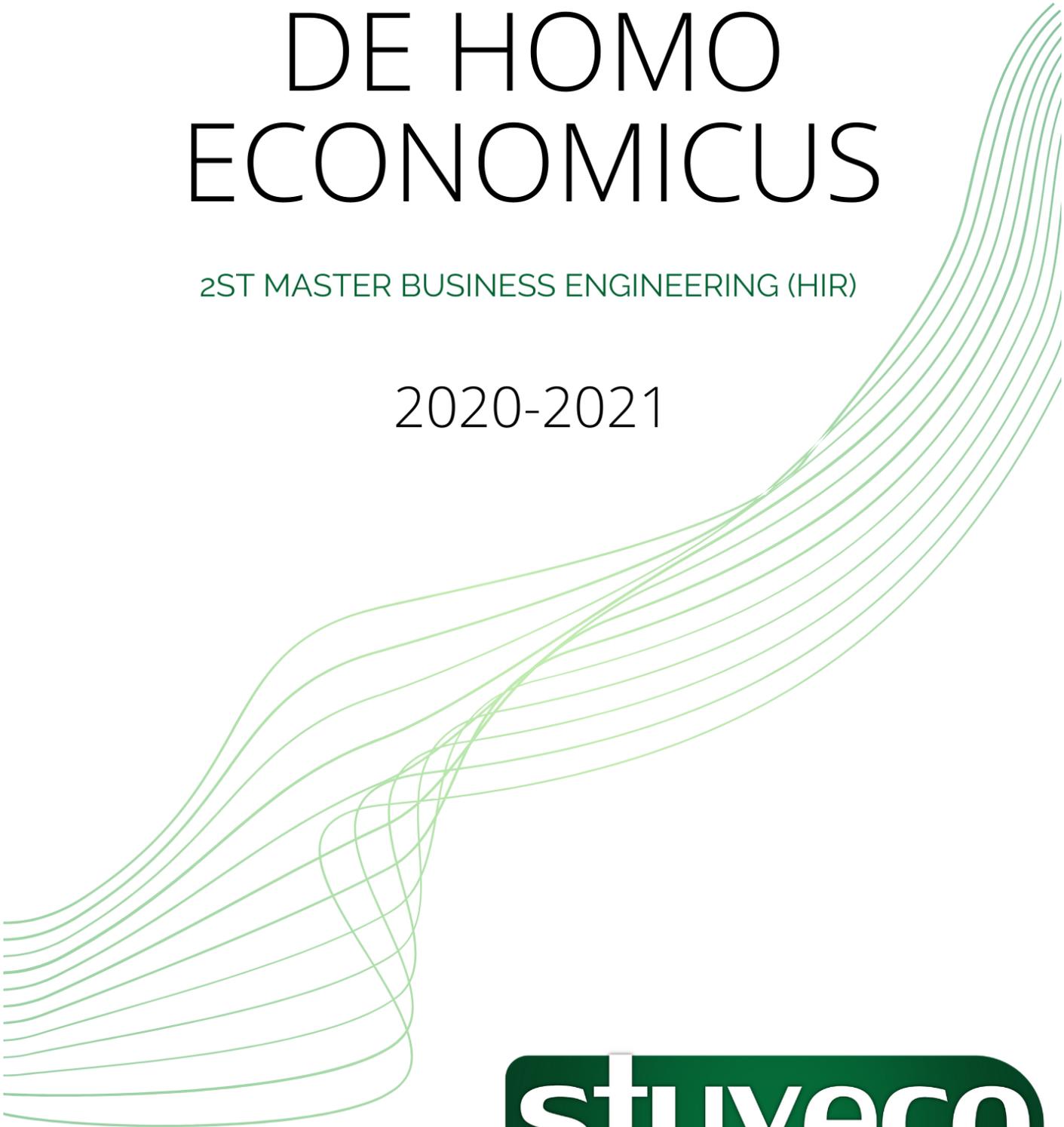
stuveco

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- Op elk niveau: voor elk vak of je thesis

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Dear 2nd Master

To prepare you as good as possible for the exams, Stuveco, the student council of the Faculty of Economics and Business Administration, provides for you in this bundle exam questions from the past years. Together with this, we also provide general information about the course and tips to study.

We update the courses yearly to give you the correct information. However, we did not receive questions of all the courses which means that several courses may still include dated information about the course and exam questions. We will clearly mention this for every course. Nevertheless, the Professor is obliged to inform you as a student in the beginning as well as somewhere at the end of the semester about his/her evaluation method. You can also find information on the study guide of each course.

For every course, you can find the score distribution on oasis.ugent.be under this school year -> my courses ('mijn cursussen'). You can then click on a course and can select above 'score distribution' to see the average types of scores students get calculated over 5 years or less.

You can help to keep the Homo Economicus up-to-date by filling in the Google Document posted in your year group on Facebook after every exam. This way, you can help the students that come after you and in return, you get up-to-date exam questions for next year (and/or august) from preceding students. Fair deal, right?

For Stuveco, this is a way to inform you and help you prepare for the examination. This is only a tool to give you some extra information in the learning process. Nothing more, nothing less..

If there are courses missing or if we give wrong information, please send an email to onderwijs.stuveco@UGent.be and we will gladly get back at you.

We wish everyone the best of luck with their exams!

In the name of Stuveco, your student council.

THE BOARD

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WHAT IS STUVECO

Stuveco is the student council of the Faculty of Economics and Business Administration of Ghent University. We provide the communication between the students and the faculty. Our main task is to represent the interests of the students. Our student representatives are members of different commissions and boards in which they, together with the professors and assistants, manage our faculty.

We manage the site www.stuveco.be in which we provide information about our Public Meetings and 'Studelen'.

PUBLIC MEETINGS

Every year, we organize 4 to 5 Public Meetings during which we discuss several topics with our members. We provide information about decisions made in boards and commissions as well as discussions about topics preceding these boards and commissions to make sure that everyone's voice is heard. After every meeting, a report is posted on Ufora and on our site.

Every student listed to the Faculty of Economics and Business Administration can attend these Public Meetings. These students can become members of several commissions in which they will present the voice of all students of our Faculty.

In May, we elect our new board for the next year. To vote, you have to attend at least 2 Public Meetings during the school year to be sure you know what the functions uphold.

STUDELEN

Studelen is an important part of our website. Here, we let students share summaries they made. Every student can upload and download these summaries FOR FREE. **The University of Ghent forbids trading summaries for money. Doing this can have severe consequences, it may even lead to suspension. Studelen is thus the only and best way to share and receive summaries.**

To upload or download summaries, you only have to make a free account on our website. When downloading summaries, do not forget to rate these so following students know which summaries are the best to learn courses.

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For the most recent information on the evaluation terms of the exam and on syllabi/books, click the link below, choose your specialization under 'Master's programmes' and click on a course to download the study sheet:
https://studiegids.ugent.be/2020/NL/FACULTY/F/

ENTERPRISE ARCHITECTURE   1ST SEM

Professor: Geert Poels geert.poels@UGent.be

GENERAL

This course consists of lectures, guest lectures, group work and exercise sessions.

The group work starts in week 6 and consists of a paper about a topic related to IT in organizations. The professor provides you with a list with possible topics from which you can choose.

The solution to this group work will be presented at the end of the semester valuated by the Professor and the other students. Group work is assessed by:

- ✔ Assessing of ability to apply the framework for IT management studied during the course (i.e., concepts and instruments) to a self-selected theme.
- ✔ Important are the clarity and soundness of the presentation
    - o Understood by fellow students?
    - o Credibility of the analysis?

EXAM

Differently from previous years, the exam is now closed book. It consists of MC-questions (with standard setting) and open questions. Questions may be related to anything seen in class.

- ✔ Assessing of understanding, insights, have you 'worked' with the material?
- ✔ Assessing of ability to apply (exercise type of question)

Final grade: 2/3 exam, 1/3 group work.

2019-2020 exam questions:

OPEN QUESTIONS (5 points)

Q1 Archimetal

You get a description of the context of ArchiMetal. ArchiMetal has assessed that customers were not satisfied with the current order process. This is why ArchiMetal wants to implement a new business service to better serve the customers. This business service is realized by a business process. There are two figures given. One is a motivation view and the other is a requirements realization view. These are both target architectures. Almost all the elements that were in the figures were new and not represented in the baseline architectures.

Q1.1 Scenario 1

By using the product view, model how this new service is presented to customers and how it is realized through the application component. The application can fully automate the functioning of the service, this makes the business process not necessary anymore, it can be left out. The service is part of a larger service that already contained 4 other services. This large service is presented as 1 bundle to the customer. The customer Service department is responsible for the business service (and is a component of the ArchiMetal HQ).

Q1.2 Scenario 2

No view specified. Work with the 2 figures given from the context description and extend these with the digital customer intimacy strategy, the CRM capability needed to execute this strategy, and a new component capability (which is a component of the CRM capability). There is a resource needed to execute the CRM capability, which is realized by the application component.

Q1.3 Subquestions of scenario 2

Which viewpoint(s) did you use in scenario 2?

Possible answer: Outcome realization viewpoint and motivation viewpoint

other possibility: layered viewpoint

What are the elements that motivated your decision to choose these viewpoints?
Possible answer:

Elements	Motivation
Motivation aspect elements	
Strategy layer elements	
Core elements	
…	

MULTIPLE CHOICE (15 points)

Q1 Which modeling technique was mostly used during the student presentation to present the MOTIVATION and the STRATEGIC FIT of the implementation of new digital technologies in enterprises?
A.   Archimate
B.   BMM
C.   BMC
D.   i* strategic dependency model
E.   i* strategic rationality model

Q2 What is not represented by SMART objectives?
A.   Strategic
B.   Measurable
C.   Attainable
D.   Relevant
E.   Time-based

Q3 Given: E^3 value model of KodakOne, exact hetzelfde als in de slides. What is the correct modeling of the value interfaces in "WEN Digital"?

(5 options are given)

Q4 Given E^3 value model of electricity network without middle man (exactly the same as is the slides). Which of the following statements is FALSE?
A.   prosumers are NOT profitable when the export tariff provided by suppliers is LOWER than the retail price at which the suppliers sell electricity to the consumers.
B.   The electricity generated by the prosumers can be traded by the ARPs.
C.   The electricity generated by the prosumers can be sold again by the suppliers to other prosumers.
D.   (...)
E.   (...)

Q5 What is the Archimate Model that best represents this i* model?

(Choice between five Archimate models. A distinction was whether a goal of i* was represented as a driver or as an outcome in Archimate. Another distinction was that the resources and task from i* were modelled as either capabilities and resources or application functions and data object.)

Q6 Which model is not used with PGA?
A.   Porter's Value Chain
B.   Goal model
C.   CDD?
D.   model from CARS
E.   Kaplan's Balanced Scorecard

Q7 Which model is not used with CDD?
A.   Capability map
B.   Goal model
C.   Context model
D.   Capability heat map
E.   Process model

Q8 Which two guest lectures covered the topics of responsible AI?
A.   Accenture and AE
B.   Accenture and IBM
C.   AE and Deloitte
D.   IBM and Deloitte
E.   AE and IBM

Q9 COBIT: which statement is false?
A.   COBIT is seen as an enterprise governance instrument, but not as an IT governance instrument
B.   all processes should be implemented to look at management Objective
C.   (…)
D.   (…)
E.   (…)

Q10 Question about the paper by Henderson and (…) about the impact of IT governance on business/IT alignment. Which statement is true?

(make sure to have read this paper very thoroughly! The statements are about details)
A.   causaal verband met oorzaak governance en gevolg alignment
B.   causaal verband met oorzaak alignment en gevolg governance
C.   Relationships zitten bijna niet in baseline omdat die moeilijker te implementeren zijn
D.   COBIT wordt niet voorgesteld aan bedrijven om te gebruiken voor hun governance
E.   (…)

Q11 On which framework/method/language does Deloitte base their EA approach?
A.   Zachman Framework
B.   TOGAF Framework
C.   Archimate layer-aspect structure
D.   Cobit core model
E.   Archimate views structure

Q12 Which model does not take into account the teleological view?
A.   Benefits map
B.   CDD-goal model
C.   Capability model
D.   Archimate motivation view
E.   Archimate stakeholder view

Q13 Questions about Business Model Cube. Which statement is FALSE?
A.   (something about cost en value in 'my propositions')
B.   BMC models value to customer
C.   BMC cannot model value to partners
D.   BMC models value from partner
E.   (...)

Q14 Questions about Component Business Model (business components and business services).
A.   Business components is hetzelfde als capability van CARS
B.   Business components provide business services for components out of CBM
C.   Business components is hetzelfde als capability van CDD
D.   (...)
E.   (...)

Professor: Miguel Meuleman Miguel.meuleman@UGent.be

GENERAL

This course consists of lectures, group work and coached exercises (cases).

EXAM

The exam is closed book. It will consist of both MC-questions, open questions, exercises and essay-type questions. The material covered by the guest speaker is an important part of the course. The cases discussed during the class sessions or presented by the guest speakers only serve as illustration. You hence do not need to 'know' the details of the cases. Obviously, understanding the underlying reasoning and how certain conclusions have been reached is important.

The additional readings, as well as any additional texts that might be distributed during the course, are solely meant as background material for interested students. Although interesting and relevant, no questions directly relating to these texts will be asked during the exam. Nevertheless, students will benefit from reading the texts, as they will strongly enhance the learning experience and the understanding of the course material.

Final grade: 20% case, 80% written exam.

2019-2020 exam questions:

EXAM: 10 points on mc questions (standard setting)

   6 points on open exercise

   4 points on open theory questions

MC QUESTIONS (10 points)

1. What is a down round?
    a. post money valuation previous round < pre money valuation next round
    b. pre money valuation previous round < pre money valuation next round
    c. post money valuation previous round < post money valuation next round
    d. pre money valuation previous round > pre money valuation next round
    e. none of the above
2. What does not belong in a term sheet?
    a) management fees
    b) anti dilution provisions
    c) places on the board of the company
    d) liquidation preferences
    e) none of the above
    f) all of the above
3. What is the most important for early stage VC investors according to the paper "How do VC make decisions?"?

a) team
b) valuation
c) business
d) industry
e) …
4. Small VC method valuation exercise to calculate equity percentage

EXERCISES (6 points)

Scooter company in Sweden. Investors are very interested...
1. calculate success rates development phases from phase 1 to phase 2, 3, 4, … and phase 2 to phase 3, 4, … and phase 3 to phase 4 etc.
2. Make a cap table for A) and B) round and calculate post money valuation for
   A) round via VC valuation method (55% IRR, sales 250 million per annum for 5 years, multiple of 6 for P/S)
   B) Round post money valuation is 1.1 billion euros
      o Founders have 1 million shares from the start
      o New: one investor invests in A and B round, take dilution into account for the A round + new equity stake from the B round!

OPEN THEORY QUESTION (4 points)

1. Explain the founder's dilemma rich vs king.
2. What are the best financing methods for staying/becoming king/rich? VC/BA/accelerator/…
3. If the founders want to keep their dilution at a minimum, what is the best financing method they can use?

Professor: Johan Verrue johan.verrue@UGent.be

GENERAL

This course consists of a project

Important note from the study guide: "It is necessary to attend all educational activities. The student's research is streamlined through a conceptual and practical framework. The conceptual framework is explained by means of lectures and also supervised by the coach. The student team presents (oral and written) interim results and receives feedback on it."

EXAM

This course does not have a written exam, only a group work. For this group work, you have to write a business report, and do a final pitch

- ✔ Project
  - o Start from a problem or challenge
  - o Build a prototype and a business model
- ✔ Methodology
  - o Business Model Canvas
  - o Prototyping
  - o Feedback loops through desk and field research
  - o Deliverables
  - o Business report and financial plan
  - o Pitch
- ✔ No traditional exam
- ✔ Evaluation
  - o 60% business report
  - o 40% pitch & oral defense

Professor: Katrien Verleye katrien.verleye@UGent.be

GENERAL

The course consists of lectures, guided self-study, group work and seminars: coached exercises.

After introducing different theoretical frameworks and practical tools associated with innovation management via lectures - online or not - and self-study, students are invited to the "special sessions", i.e., seminars (whether or not online) with coached exercises and/or online discussions. These special sessions go along with a group assignment and/or individual assignment and result in a written and/or oral report.

EXAM

The exam is written and consists of open questions only.

Final grade: 25% group work, 75% written exam.
To pass, a student needs to take part in all forms of evaluation - permanent and the end-of-term evaluation.

TIPS:

- ✔ The video material in the slides is part of the course content!
- ✔ Two obligatory readings are mentioned in the slides
- ✔ Position your question within the context
- ✔ Visualize/structure your response
- ✔ Be prepared to give examples
- ✔ The written exam is – as mentioned in the first session – based upon content from
  - o Lectures (i.e., content slides combined with information in textbook Schilling 2017)
  - o Special sessions (i.e., design challenge, case discussions, and poster exercise)
- ✔ Make sure that you understand the key innovation management concepts, models, and techniques and are able to
  - o Illustrate the key innovation management concepts, models, and techniques with your own examples
  - o Apply and integrate key innovation management concepts, models, and techniques to (inter)national business cases and practices, including cases and practices discussed during the lectures and special sessions
  - o Discuss strategic choices concerning innovation and implementing these choices in a scientific and structured way (=refer to key innovation management concepts, models, and techniques when discussing strategic choices)
  - o Critically reflect upon strategic choices concerning innovation and the implementation of these choices from an economic, social and ethical perspective

SPECIAL SESSIONS:

Please note that the assignments conducted during the special session are an important aspect of the course and your learnings can be assessed during the exam. More specifically, you can get one of the following questions

- ✔ The video material in the slides is part of the course content!
- ✔ Special session 1:
    - o How does design thinking differ from traditional approaches to new product and service development?
    - o What skills do design thinkers need to acquire/possess to ensure success? Explain.
    - o Under which conditions would you recommend the use of design thinking tools? Explain.
- ✔ Special session 2
    - o All textbook case questions discussed during special session 2 (your own group + other groups)
    - o How do the innovation management strategies discussed in the academic readings in special 2 differ from those discussed in the lecture (Laïfa and Josserand for Group A, Lee and Hung for Group B, and Van Dijk et al. for Group C)?
- ✔ Special session 3
    - o Choose one of the innovations proposed in special session 3 and explain the fit between one of the elements of a deployment strategy and the industry dynamics.

We did not receive any exam questions.

Professor: Frederik Gailly Frederik.gailly@UGent.be

GENERAL

This course consists of guided self-study, demonstration, group work, lecture, seminar, lecture: plenary exercises.

Lecture, Demonstration and Seminar:
Students need to read oner or two chapters as preparation for he lecture. During the lecture two different sessions are distinguished:
• session 1: Important BPM concepts and methods are described in more detail and students can ask for additional information
• session 2: the new concepts and methods are demonstrated by means of a case or a guest lecture
• session 3: If possible the new concepts and methods are applied by the students.

Groupwork: there are three options:

Option 1: BPM project

In groups, the students need to develop a business process model in BPMN that represents the business process of an existing business. This business process model needs to be analyzed and improved. The groups also have to evaluate the report/project of another group using a provided rubric.

Option 2: DXC Masterclass

Students participate in groups of 6 in the DXC Masterclass. The masterclass is organized in 6 different sessions that alwats start with a plenary session with a DXC consultant as guest speaker. The second part of the session is organized a break-out session in which the different groups under the guidance of the DXC consultants tackle a specific business problem.

Option 3: BPM research paper

In group the student will thoroughly analyze a BPM research paper. This means that you they will have to analyze and discuss the different parts of the researchprocess. Next they will act as reviewers for the paper.

EXAM

The exam is oral with a written preparation.

Your final grade is calculated in two different ways, depending on participation in the experiments:

1) In case an experiment is organised: 45% on group project + peer evaluatie, 45% on the exam and 10% partcipation experiments
2) In case no experiment is organised: 50% on group project + peer evaluation 50% on the exam

2019-2020 exam questions:

o Explain the steps in the alpha algorithm by means of the following log. Log = [{a, b, c, d} ; {a, c, b, d} ; {a, e, d}]
o Compare waste analysis with value added analysis. How can they complement each other?
o Compare BPR to BPM. Why is BPR a redesign approach?
o Compare applying flow analysis, queuing theory, and business process simulation.
o Token replay (exercise 2)
    1) What conformance checking does there exist beside token replay?
    2) What conformance checking does there exist that does not use process models and event logs?
o Create a log file that can be used to automatically discover the process model A from appendix E (workflow log)
    1) Explain how blockchain technology can influence process performance measures (2 metrics)
o A process engineer considers implementing blockchain technology in order to redesign several business processes in a company. For what type of processes are blockchain technologies suited and for which types not? In case of implementation, what are the challenges and issues?
    1) Which aspects of the BPM cycle are affected by blockchain?
    2) Additional: specific implementation.
o Given the process model in appendix B & the error count, identify which issues need to be solved first using pareto analysis?
    1) Spreadsheet version (15)
    2) Request entry not made (10)
    3) Request not updated upon resolution (20)
    4) Lost request (30)
o Starting from the event log in appendix A, evaluate the quality of the process models B, C en D in appendix E.
    1) What if there are multiple traces that possibly appear multiple times? How would you then calculate the fitness value?
o Explain why both the Balance Score Card and ITIL can be classified as Business Process Identification Methods
o Appendix C is given.
    1) Evaluate the quality of the process model
    2) Describe how it can be improved
    3) Generate a log for this improved process model that can be used to mine this model
    4) What extra information is needed in order to make the process model executable for a process management system?
o Can we use business model canvas and SAP reference model in the x phase of BPM? explain why?
    1) Which one do you use for architecture and which one for process selection?

- Use value added analysis as a redesign method on model B from the appendix.
    1) Why have you chosen VA, BVA and NVA for certain activities?
- How can process mining be used in the context of healthcare? (question about a guest lecture)
- A case team completes jobs at a rate of two per hour, with actual processing time following an exponential distribution. Jobs arrive at a rate of about one every 32 minutes, and the arrival times are also considered exponential. Use queueing theory to answer the following questions:
    1) What is the average cycle time?
    2) What is the cycle time efficiency?
- Explain the concept of token replay starting from the following process model and the log (a, b, d, e, g).
    1) What if there are two different traces and these appear x times. How would you calculate the fitness value?
- Explain why a business process management system can be classified as domain independent Process-aware Information System?
    1) Can you just put a process in BPMS?
- Describe Process Simulation in a nutshell and give an overview of the different steps using the process model in Appendix C.
- List a few activities, resources, events and process variables for the following processes:
    1) Check-out process at a grocery store
    2) Admission Process at hospital
    3) Insurance Claim Process
- Build a process model for the text in appendix H, and calculate the cycle time.
- Illustrate possible challenges for event log extraction with an event log by means of the container handling case (AE) and the process mining case executed at the emergency department
- Explain the difference between imperative and declarative process modelling languages by means of some examples

BIG DATA   1ST SEM

Professor: Dirk Van den Poel dirk.vandenpoel@UGent.be

GENERAL

This course consists of group work, lecture, seminar: practical PC room classes. Ex cathedra sessions as well as active class discussions of the different techniques and models with interactive exercises in the PC room.

From the study guide: "Numerous exercises are being solved during sessions. In addition, assignments (to be solved in teams) are handed out. Students will receive coaching in the process of solving the assignments and feedback afterwards (collectively, by team and individually). After tests about the programming language SQL and about Big Data & Python/Apache Spark, students will receive collective as well as individual feedback & coaching."

EXAM

Final grade: 30% on SQL exercises/exam and 70% on Big Data/Apache Spark/Spark SQL/Python group assignment.

Of the 70% **group assignment score** 30% is based on individual questions and 40% is based on group performance. To pass, a student should pass both parts of the evaluation. If a student does not pass for both parts and the score is 10/20 or more, the score will be reduced to 9/20. Teams will be randomly selected during class to present their solutions to assignments. A maximum of two bonus points (of 20) can be earned in this way.

The exam is in the middle of the semester, partly open and partly closed book.

We did not receive any exam questions.

Professor: Dirk Van den Poel dirk.vandenpoel@UGent.be

GENERAL

This course consists of group work, lecture, seminar: coached exercises, seminar: practical PC room classes. Ex cathedra sessions as well as active class discussions of the different techniques and models with interactive exercises in the PC room.

From the study guide: "Numerous exercises are being solved during sessions. In addition, assignments (to be solved in teams) are handed out. Students will receive coaching in the process of solving the assignments and feedback afterwards (collectively, by team and individually). After tests about the programming language R as well as their insights into using advanced aCRM and advanced statistics, students will receive collective as well as individual feedback & coaching."

EXAM

The final grade:

50% Written exam to determine to what extent the student mastered: the principles of preditive and prescriptive analytics, the higher programming language R, the principles of advanced analysis techniques and the use of R to solve non-trivial business problems by means of predictive / prescriptive models.

50% Paper with oral defense as part of a group work where the students will solve a real business problem using analytical techniques (potentially corrected by peer assessment). Teams will be randomly selected during class to present their solutions to assignments. A maximum of two bonus points (of 20) can be earned in this way.

1st part of the semester before Easter break: written, open book exam.
2nd part of the semester: group work with presentations.

2019-2020 exam questions:

Theory (1h, 4 points out of 20)
o   Why is random forest better than bagging. What problem does it solve?
o   Explain SOM (using BMU in your explanation).
o   Spherical clustering needs a lot of computing power. Quite the same can be done by Hierarchical clustering. Which kind of linkage would you use, why?
o   Explain what error is still present when using bagging and give an alternative method to omit this problem. Include the trade-off theory of bias and variance.
o   Explain: Regularization for a decision tree: 2 type.
o   Explain regularization for regression (2 types). Which type can be used to extract the important variables?
o   Explain: AUC of 73%, use the formal definition

Exercises (2h, 16 out of 20 points)
- o Training a random forest model.
- o Make the basetable.
- o Cross validate a random forest on 3 folds → train…
- o Use evaluation metrics (AUC, specificity, lift)
- o Write deployment code so non-programmers are able to predict (based on given information)
- o Make code to perform the AUC and visualize. Do not use the AUC package but write self-written code (2 points)
- o Perform PCA (including data preparation).
- o Clusters: K-means (optimize clusters)
    1) Visualize k-means.
- o Hierarchical clustering using Ward's method -> how much clusters is optimal?

DECISION MAKING FOR BUSINESS   1ST SEM

Professor: Mario Vanhoucke mario.vanhoucke@ugent.be

GENERAL

During the course, both theoretical and practical sessions will be given. The theoretical part focuses on the advantages and disadvantages of different optimization models. The practical part consists of one of a number of well-known cases from literature or the recent research areas of different groups at our university. The students will have to analyze the case study and present solutions.

The course is a mixture of theoretical sessions, exercises in groups, and presentations by guest speakers. During the exercise session, students will have to present their results.

EXAM

The final exam consists of two parts: A written exam at the end of the course (50 % of final score) and one or more team works (50 % of final score). The team works consist of a real-life or fictitious case study that has to be discussed in a written report and an oral presentation. The subjects are updated annually and are related to the recent publications in the operations research area.

2019-2020 exam questions:

1. **Assignment problem (10 of 20 points)**

Make a linear programming model based on the problem description. The constraints that had to be modeled were described in words.

(50% of points)

2. **Travelling salesman problem (6 of 20 points)**

2.A.1. What representation would you choose for this problem? (1 salesman)

2.A.2. What is a single-pass algorithm that would give you a good solution? Illustrate with an example.

2.B.1 Imagine that now there are multiple salesmen that all leave from a central point. How would you represent the solution?

2.B.2. Imagine that certain sequences need to be respected (e.g. city i needs to be visited before city j). What is the impact on your answer in 2.A.1. and 2.A.2.? Illustrate with an example.

2.C. Meta-heuristics

2.C.1. Apply and explain genetic algorithm
- o Explain all steps with an example. What is the general flow? What are the main building blocks?
    - ▪ Which are the operators for a crossover or mutation phase

2.C.2. Explain another example of a meta-heuristic (= simulated annealing) and the difference with the genetic algorithm

2.C.3. Explain how local search can have an added value for the genetic algorithm. Illustrate with an example.

3. **Linearize (4 of 20 points)**

a) Y <= min(x1,x2) with x1,x2 binary values

b) x3 >=x1*x2 with x1 binary, x2 [0,M] (with M being any positive integer value], x3 integer

Hint: use Big M

c) Alldifferent(x1,x2,x3) (in other words x1≠x2, x2≠x3, x3≠x1) with possible values for x1,x2,x3 [1,2,3,4]

Hint: create 12 = 3*4 new binary variables

Professor: Tarik Aouam tarik.aouam@ugent.be

GENERAL

The course consists of Group work, (online) lecture, (online) seminar: coached exercises and (online) seminar: practical PC room classes. Course sessions are a combination of lectures, exercises and case studies and guest lectures.

For the group work, you need to make a report and a presentation of it at the end of the semester.

EXAM

Final score is based on Exam: 75% and Permanent: 25%.
The exam consists of exercises and comprehensive questions.

2019-2020 exam questions:

- o Discuss for lot size based quantity discounts, volume based quantity discounts and trade promotions:
    1) How do they work?
    2) How do they increase bullwhip effect?
    3) How do they decrease bullwhip effect?
- o Exercise on complete aggregation and tailored aggregation
    1) Calculate cost saving and explain why this is high or low
- o Exercise on contracts
- o Exercise on linear modelling of a SC

BUSINESS VALUATION   1ST SEM

Professor: Luc Keuleneer luc.keuleneer@UGent.be

GENERAL

This course consists of lectures, integration seminars, seminar: coached exercises. We use a combination of teaching methods, including traditional lectures, discussion of cases and conducting a valuation of a real-life company with a question and answer session with valuation experts.

EXAM

The final grade: two case studies (50%) and written exam (50%).

The exam is written and consists of MC-questions with standard setting. Last year the students got in total 15 MC-questions in which you hade to do a lot of calculations.

The first **case study** is a group project on valuation of a fictive company (15%; report + peer evaluation). The second case study (35%) is a group project on the valuation of a reallife company. You will have to hand in a valuation report on your valuation analysis and present your valuation analysis. Your grade for the case study is based on a group grade adjusted by your peer evaluation score and performance during the presentation. You will present your case in front of a jury comprising academics and practitioners specialized in business valuation.

Professor: Frank de Jonghe frank.dejonghe@UGent.be

GENERAL

This course consists of lectures and a group work. Ex cathedra for theory sessions; interactive exercise session; presentation and discussion of assignments by the students. Group preparation for assignments.

EXAM

The exam is written.

Your final grade is 100% based on your performance on the exam. The exercises on the exam are for more points than the theory.

TIPS:

- ✔ Explain the theoretical questions as clear as possible based on formulas or mathematical proofs (he makes a lot of notes to his slides).
- ✔ For the exercises, it is important that you recheck your calculations for reckless mistakes. The exam questions as seen in class are important to understand for you to be able to make the exercises on the exam.

EXAM 2018-2019:

THEORY

- ✔ Proof that the prices of forward and futures are equal
- ✔ Explain of one or multiple graphs the options and their boundaries
- ✔ Insight question about options
- ✔ Explain VaR
- ✔ Questions about the chapter i.r.w. Black Merton-Scholes

EXERCISES

- ✔ Calculate FRA (similar to exercises in class on forwards and swaps)
- ✔ Calculate value (swaps)
- ✔ Exercise using the binomial tree (similar to class)
- ✔ A pay-off graph of options is given, give the portfolio of this graph

2019-2020 exam questions:

✔ Suppose a Reuters screen gives you the following quotes:

Interest rates

        R(EUR,3M): 1,5%   single compounding

        R(EUR,6M): 2%   single compounding

'Make sure to write down all necessary mathematical relations/equations)

Foreign exchange market

        Spot rate: 1,30 EUR/USD   (value of 1 EUR expressed in USD)

        FX Forward rate 3 months = f(0,3): 1,2968 EUR/USD

        FX Forward rate 3 months =f(0,6): 1,2936 EUR/USD

1. What are the interest rates for 3 and 6 months in USD (single compounding) implied by the Forex Forward rates?
2. What is the forward rate between 3 and 6 months = f(3,6)?
3. Suppose you enter a (long) forward contract where you sell 1 000 000 EUR with a time to maturity of 6 months. After three months (so three months remaining), you observe the following quotes:

✔ Calculate, based on the following conditions, the value of the forward contract.

        Spot rate: 1,20 USD/EUR

        FX Forward rate in 3 months: 1,1881 USD/EUR

        R(EUR,3M): 5%

        R(USD,3M): 1%

✔ In the world of Overnight Collateralized Swaps (OIS), we learnt a lot about blabla the validity of swaps. Consider the following OIS quotes:

        6M   2%

        1Y   2,2%

        2Y   2,3%

        3Y   4%

1. Calculate the Discount Factors of all OIS quotes through bootstrapping (make sure to write down the formula next to the result).
2. Compute the start forward swap rate (annual coupon) for a OIS that starts in one year from now and will last for two years.

✔ Binary/digital option = an option that will pay you out a lump sum amount of Q if the stock price at maturity is above the strike price X

Suppose the following features:

        Spot price (S0): 10 EUR

Strike price (X): 10 EUR

Fixed lump sum (Q): 100 EUR

Rc for 1 month: 3%

Value option today: 50,5969 EUR

1) Calculate the risk-neutral probability that the stock price will go up in the next period and hence exceed the strike price (i.e. the option is in-the-money).

p = 0,5072

2) Compute the implied volatility: d=0,9439 & σ=0,20
3) Determine the value of an American put option on a non-dividend paying stock with the following properties. Construct a tree that covers the stock price, pay-off and backward iteration:

Time to maturity: 3 months (3 time steps)

X: 10 EUR

S0: 8,5 EUR

4) Why is a European option of a non-dividend paying stock always more worth than a short forward contract on the same stock? Why is an American option always more worth than a European option? After a significant dividend announcement, does the probability to early exercise increase/decrease?

✔ Imagine the current stock price is 10 EUR, having an annual expected return of 10% and volatility of 15%. Give an expression that determines the probability that the stock price one year from now will be above 11 EUR, starting the equation ut infra:

$dS=\mu*dt+\sigma\sqrt{dt}*\varepsilon$

1) Based on the estimation for S(T), generalize this through Monte Carlo for the valuation of derivatives.
2) Use the Cholesky decomposition to determine the pricing process of multi-asset options.

✔ Prove the following equation: P(X=100)≤(P(X=110)-P(X=90))/2
✔ Explain intuitively, using a combination of non-arbitrage arguments and graphs. Imagine an equity underlying of a call option, that has never paid a dividend. Suddenly, out of the blue, the company announces a dividend. What will happen to the call option's price?
✔ Distinguish a European and an American call option (3/20)
✔ Derive the binominal model equations for an option on a future. (2/20)
✔ Explain the key ideas behind the Merton Structural credit model. What are the option structures involved? How can you link the volatility of the fair value of a company's assets to its credit spread? (at least in theory) (2/20)

✔ Given the VaR over a 1d horizon, ho can I estimate the VaR over a 10d horizon? What principle do both these s build on? (eerste deel vd vraag is niet volledig zichtbaar. Het enige wat er staat is: dS=rSdt+ σS√dt ε ?) (2/20)

✔ Consider the following pieces of market information:

USD

1y swap rate =	1%
2 y swap rate =	1.8%

EUR

Euribor_6M =	0.10%
Forward (6,12) =	0.50%
Forward (12,18) =	0.80%
Forward (18,24) =	0.80%

1) For both the USD and EUR, compute the 1 and 2 year discount factor, and the zero coupon rate in the annual compounding. You may assume that day count conventions are such that 6m correspond to a factor of 0.5.
2) BONUS POINT: once that is done, assume that the 3y discount factor in EUR is: DF_EUR(3) = 0.9750. Compute the par swap coupon rate for a forward start swap in EUR that starts 1Y from now and matures after 2y (at the end of year 3)

Do explicitly write the formulas that you are using before applying them to the data at hand (2+1/20)

✔ Assume that the EUR/USD exchange rate currently stands at 1.0500. I.e. you have to pay 1,05 USD for each EUR. Consider the following forward exchange contract, to sell forward EUR against USD two years from now:

If the spot exchange rate trades below parity (1 EUR = 1 USD), you will sell the EUR at 1,10 USD.

If the spot exchange rate trades above parity, you will sell the EUR at 1,20 USD.

1) Draw the pay off diagram of this contract
2) Decompose the contract in two basic components, a linear and a non linear one. There are actually two solutions to this one.
3) Explain how both are related to each other, for a bonus point.

✔ Value the contract defined under the previous question by separately valuing both its components. As said, the sport rate is 1,05. Remember it is a 2y forward contract.

The zero coupon rates in annual compounding are:

R_USD (2y) =	1,8073%
R_EUR (2y) =	0.4754%

Should you have to make a binominal tree, take time step 6 months.

The implied volatility you may use in that case is 12%.

Alternatively, for half the points, value a plain vanilla call option with strike 1,1 and 2y to maturity. (4/20)

Other questions
- ✔ Forward & swap: currencies (forward currency rates & LIBOR rates) (3/20)
- ✔ Swap exercise: forward start swap (3/20). Give fixed bond leg rate.
- ✔ Payoff drawing: binary options, P&L scheme, BE points, when would you use this strategy? (3/20)
- ✔ Binomial option tree: American put option (4/20)
- ✔ Merton idea (balance sheet company) (2/20)
- ✔ Risk Neutral Valuation: (3/20)
- ✔ How is this observed in a two-step binomial tree
- ✔ Geometric Brownian Motion & proof via Ito's Lemma: how risk neutral Monte Carlo simulation
- ✔ Choleski decomposition (Bonus) (1)
- ✔ Future = forward price under some conditions (proof) (2/20)

Professor: Rudi Vander Vennet rudi.vandervennet@UGent.be

GENERAL

This course consists of guided self-study, group work, lecture, self-reliant study activities, research project. Ex cathedra lectures, class discussions and presentation of papers prepared in groups. Focus on lectures and class discussions.

In function of the corona pandemic it is possible that the written exam gets replaced by an oral only, or even by additional tasks that test the same knowledge or competences.

EXAM

The exam is written and oral.

- ✔ Written: 5 open questions on 10 points.
- ✔ Oral is focused on arguments and solid reasoning.

Final grade: Written 60%, Oral 40%.

We did not receive any exam questions

Professor: Michael Frömmel michael.frommel@UGent.be

GENERAL

This course consists of lectures and a group work. The group work consists of exercises made in group with its solution submitted as a report. This course is taught by the same professor as for 'Investment Analysis', an has a very similar structure.

EXAM

Very different from last year is that this course does not have an exam anymore at the end of the semester. Your final mark thus only depends on the continuous assessment.

Since there is no written exam anymore, these exam questions from 2018-2019 are only for illustration:

✔ STATEMENTS (right/wrong + justify in one sentence)
1) One implication of the Grinblatt and Han (2005) model is that the adjustment speed to a new fundamental value is positively related with the turnover ratio and the share of noise traders (of the PT/MA type).
2) Overconfident insiders may even increase price accuracy on financial markets.
3) The anomalies 'price reversals' and 'momentum effect' are not in contradiction with each other.

✔ SHORT QUESTIONS
1) Why does the 'separation of brain and capital' prevent managers from correcting mispricings?
2) Briefly describe the 'dual moving average crossover'.

✔ BRIEF DISCUSSIONS (max 1 page)
1) What are the implications of the seminal model by De Long, Shleifer, Summers and Waldman (1990)? Which effects work in this model?