



Universidade Federal de Santa Catarina
Centro Tecnológico
Departamento de Engenharia Química e
Engenharia de Alimentos



Programa de Pós-Graduação em Engenharia Química

COURSE CONTENT ACADEMIC QUARTER 2024.III

I. IDENTIFICATION

Course Code	Course Title	Credits	Schedule
ENQ410038	Entrepreneurial Toolbox for Engineers	3.0	Tuesdays 13h30 – 17h10

II. INSTRUCTORS

Prof. Dr. Eng. David Fernandez Rivas

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Prof. Dr. Cíntia Soares

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Prof. Dr. Natan Padoin

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III. TEACHING ASSISTANT

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IV. FREQUENCY

The frequency will be registered in the instructors' dashboard.

V. LEVEL

M.Sc. and Ph.D.

VI. SYLLABUS

This course aims at filling the knowledge gap of how-to-start innovating, as a guide for the 21st century's problem solvers. It is meant to be an interactive and self-driven experience, where students apply prior knowledge and newly acquired tools to propose new designs or concepts. There will be tips and examples of professional trajectories told by innovators about their journeys, which will prepare you for the fast-changing world we are living in. We will clarify the words innovation and entrepreneurship, which you might have heard in different contexts.

A project will be assigned to small teams (2-3 students), with the best match between students' interests and an existing "problem" database. All problems/projects belong to a "living" set of challenges or questions that have been selected from communication with existing industry or identified from relevant academic topics. There is also a possibility for the team of students to define a problem of their choice, in collaboration with the teacher/instructor.

Your challenge will be to make sure the open-end project progresses, assisted by strategy template documents, such as the business canvas model and an empathy canvas model. Together with the

instructor(s), we will define in what direction to move forward. As outcome, you will be able to defend your proposed solution (prototype or concept). The arguments will be based on elements to convince engineers and business/project managers about the risks/advantages of implementing the new process, equipment or product.

The final video and presentation slides are the most important deliverables of this course, as a means to guarantee an efficient knowledge transfer between different groups of students.

VII. OBJECTIVES

At the end of this course, you will be able to:

1. Explain and use a framework with three tools, Knowledge, Persuasiveness and Empathy (KPE).
2. Identify the role of KPE in each of the six-steps 'Guide to Innovate' and explain the definitions of 'Engineer' and 'Entrepreneur'.
3. Use the KPE framework to solve problems of different natures, executing their own innovation journey.
4. Decide which indicators to use with the Intensification Factor (IF) method to calculate for different solutions or alternatives to a given technology, apply it in making decisions, and assess the Applicability (A) of a given solution.

Equipped with KPE, IF, and A, the groups of students will be able to compare the relative merits of different solutions.

VIII. COURSE CONTENT

1. Slides and other materials in online environment accessible to all students.

IX. METHODS

The classes will be held on-line at the MS Team environment (all students were enrolled).

The Dutch teaching team will provide recordings and at least two online moments to interact with the Brazilian students.

Any other online communication will be done via Canvas and emails.

X. EVALUATION

The evaluation will be based on a combination of self-driven questionnaires in the Canvas environment (40%) and the submission of a powerpoint file with voice-over and camera recording from the student.

XI. SCHEDULE

Order	Activity	Type	Platform	Short Description
Prep 1	Welcome	Individual	Canvas	<p>Instructor(s) give short intro to course/canvas/eduflow PI as Innovation tool – reading material Read from EEE book:</p> <ul style="list-style-type: none"> - Chapter 1 – I am short of time! - (<u>reading time 2 min</u>) - Section 5.8 – Watch out! - (<u>reading time ~10 min</u>) o Please watch minutes: between 15:10&16:17 and 32:26&33:32 of the following video: https://www.youtube.com/watch?v=to2GSibbrv0

				Section 5.10 – About Teams – (reading time ~ 5 min)
Meet 1	Date: Wednesday September 11 th 13:45 – 15:30	Individual Group	Classroom HB 2B	First meeting for students and instructor. Introducing each other and discussion of planning Presenting Project way of working
Prep 2	Date: Before Sep 17 th	Individual	Canvas Self-study	Read first - Section 2.3.3 – K Knowledge - (<u>reading time ~5 min</u>) - Section 2.3.4 – P Persuasiveness - (<u>reading time ~5 min</u>) Section 2.3.5 – E Empathy - (<u>reading time ~5 min</u>) Reflection 1 (pass/no pass) Student follow activities at their own pace, e.g. 1. K - Knowledge 2. P - Persuasiveness 3. E - Empathy 4. What is empathy? - Discussion
Meet 2	Date: Wednesday September 18 th 13:45 – 15:30	Individual Group	Classroom RA 2504	IF and Applicability, SEST Microfluidics and Process Intensification Open Peer Pulse Open Quiz Help with Quiz -
Walk	Walk-in hours	Individual Group	Instructor's office/online	Students signal the day before the allocated day-time slot. – Instructor defines 1 moment per week students can walk-in.
Project draft	Peer review	Individual	To be decided	1) Individual presentation template submission of PPT 2) Peer review (1 student review another one) (date to be defined)
Prep 3	Date: Before Oct 1st	Individual	Canvas Self-study	Follow Canvas Entrepreneurship What is Innovation Quiz – Final Questions 5. Heat Pipe 6. SEST vs TRIZ 7. IF calculation 8. Applicability
Meet 3	Date: Wednesday October 2nd 13:45 – 15:30	Individual Group	Classroom VR 501	Working on cases Submit PeerPulse deadline for peer review
Prep 4	Date: Before October 21st			Read from EEE book: - Section 2.5 – KPE against epidemics pp. 20- 24 - (<u>reading time ~10 min</u>) - Section 6.2.5 – The Challenges are there, but can we see them? pp.132-134 (<u>reading time ~8 min</u>) - Section 6.2.6 – Flying droplets pp.134-135 (<u>reading time ~8 min</u>) Check the Empathy Canvas and study it (we will be using it during the class)

Meet 4	Date: Wednesday October 22nd 13:45 – 15:30	Individual Group	Classroom HB 2D	Role play Peer review feedback in PeerPulse deadline
Prep 5	Date: Before October 31st			Reflection 2 (pass/no pass) Continue updating Project Eduflow
Meet 5	Date: Monday October 31st 13:45 – 15:30	Individual Group	Classroom HB 2A	How Teacher has used KPE in own work Wrapping course Discussing last preparations for Video submissions
Final delivery	Project Slides 1 A4 submission	Group	Eduflow	1. Student resubmits with feedback and voice over recording. November 5th, Project presentation file

Ultimate deadline: November 7th, 2024

XII. BIBLIOGRAPHY

- Scientific papers and supplementary material available at the online platform Canvas Moodle UFSC.
- **Basic Bibliography**
 1. More information can be found in this eBook (through the teacher)

<https://research.utwente.nl/en/publications/empathic-entrepreneurial-engineering-the-missing-ingredient>



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