Form for Developing the Syllabus of Courses for the International Week

This document is intended to complete in the empty boxes the information for developing the syllabus of courses for the international week.

Please complete the following mandatory boxes:

I. General Information

Complete the following general information:

Course name:

Neuromarketing as Technology Innovation in Research – experimental design, processing, interpretation

Teacher's name:

Sylwester Bialowas

II. Introduction

Describe briefly, simply and synthetically what the course consists of and its formative scope. To do so, indicate what the course offers or provides to the student, mentioning its practical and theoretical usefulness.

Write the course introduction in the box below:

This course provides a comprehensive exploration of how neuroscience and consumer psychology intersect with marketing strategies and decision-making processes. Students will learn how the human brain responds to marketing stimuli and how this knowledge can be applied to develop more effective marketing campaigns. The course combines theoretical foundations from neuroscience, psychology, and marketing with practical applications in consumer behavior analysis and market research. Students will be introduced to key neuromarketing techniques, including eye tracking, electrodermal activity (EDA), emotion recognition, electroencephalography (EEG), and functional magnetic resonance imaging (fMRI), understanding their role in measuring consumer responses and preferences. The course will also delve into sensory neuromarketing, examining how our senses are affected differently as consumers and how to organize communications to better utilize all the senses. This includes understanding how the brain processes sensory information and the tools available for assessing the impact of senses on consumer behavior.

Eye tracking, EDA, sensory rests, and emotion recognition will be introduced with real-life cases. The EEG and fMRI will be introduced only theoretically and based on literature cases, without cases from experience.
Additionally, students will explore the ethical considerations and limitations of neuromarketing research and its implementation in business settings.
Additionally, the course will cover emotions, attention, and memory in relation to marketing stimuli, as well as the ethical considerations and limitations of neuromarketing research and its implementation in business settings.
This course will equip students with valuable insights and tools for careers in marketing, market research, advertising, and consumer behavior analysis, while also developing a critical understanding of the relationship between brain science and consumer behavior in today's marketplace.

III. Final Learning Achievement of the Course

The final learning achievement is a precise and assessable statement of what a student is expected to be able to do at the end of the course. They are essential for guiding the teaching process, assessing student progress, and verifying the acquisition and application of knowledge.

At the end of the course, the student will be able to design a neuromarketing research study, applying various techniques such as eye tracking, electrodermal activity (EDA), emotion recognition, and electroencephalography (EEG) to measure consumer responses and preferences. The student will effectively analyze the data collected from experiments, and draw meaningful conclusions about consumer behavior, emotions, attention, and memory in relation to marketing stimuli.
Students will demonstrate an understanding of how sensory inputs influence consumer decisions and how to design marketing communications that effectively utilize sensory elements. They will also analyze the ethical considerations and limitations of neuromarketing research and its implementation in business settings.
The course will equip the student with the practical skills and theoretical knowledge necessary to develop more effective marketing campaigns, understand the relationship between brain science and consumer behavior, and apply sensory neuromarketing principles in real-world marketing scenarios.

IV. Learning Units

In this section the **final learning achievement of the course** is moved and the **thematic contents** to be developed are indicated.

Learning unit 1:

Learning Unit 1: Foundations of Neuromarketing (4 hours)
Learning Achievement:
By the end of this unit, students will understand the fundamental concepts of neuromarketing and its role in consumer behavior analysis.
Contents:
• **Introduction to Neuromarketing (1 hour)**
  ○ Definition and scope
  ○ Historical context and evolution
• **Interdisciplinary Foundations (1 hour)**
  ○ Intersection of neuroscience, psychology, and marketing
• **Introduction to Sensory Marketing (1 hour)**
  ○ Role of senses in consumer perception
• **Key Techniques Overview (1 hours)**
  ○ Eye Tracking
  ○ Electrodermal Activity (EDA)
  ○ Emotion Recognition
  ○ Electroencephalography (EEG)
  ○ Functional Magnetic Resonance Imaging (fMRI) (theoretical basis)
 	
Learning Unit 2: Biometric Experiments design (4 hours)
Learning Achievement:
Students will be able to design and conduct experiments,
Contents:
• **Designing Sensory Experiments (3 hours)**
  ○ Methodologies and tools
  ○ Between-subject and within-subject approach
  ○ Field and lab experiments
• **Case Studies and Applications (1 hour)**
  ○ Real-life examples of sensory marketing

Learning Unit 3: Experimental Plans and Data Analysis in Neuromarketing (4 hours)
Learning Achievement:
Students will gain proficiency in analyzing and interpreting data from neuromarketing studies.
Contents:

- **Independent, dependent and control variables (1h)**
- **Pre-experiments, quasi-experiments and true-experiments (1h)**
- **Data Collection Methods (1h)**
- **Data Analysis Techniques (1h)**
    - Statistical tools and software
    - Interpreting findings

Learning Unit 4: Practical Applications and Ethical Considerations (4 hours)
Learning Achievement:
Students will understand the ethical implications of neuromarketing and its practical applications in business settings.
Contents:

- **Business Applications (2 hour)**
    - Implementing findings in marketing strategies
    - Future trends in neuromarketing
- **Limitations and Challenges (1 hour)**
    - Methodological and practical constraints
- **Ethical Issues in Neuromarketing (1 hours)**
    - Privacy concerns
    - Consent and data protection

V. Teaching Strategies

The teaching strategies respond to the characteristics of the course and the teaching methodology used by the teacher.

Below are some teaching strategies that can be selected. Write an "x" in the box corresponding to the teaching strategies you use in your course. If one of these strategies does not fit your course, add the strategy at the end of the list and describe it:

Teaching Strategy	Write an x
Dialogic presentation: *It consists of the explanation and demonstration of contents by the teacher, with the intervention of the students, either through questions or presentations of works prepared by the students.*	x
Exercise and problem solving: *It consists of asking students to solve exercises and/or problems by using formulas or algorithms, applying procedures and interpreting the results.*	x
Case studies: *It consists of an in-depth analysis of a fact, problem or real or hypothetical event in order to interpret it, generate hypotheses, diagnose it and solve it.*	x
Group dynamics: *It consists of activities of a different nature conducted collaboratively between two or more students, and their purpose is to learn how the groups interact and thus facilitate learning from experience.*	x
Structured discussions/ debates: *It consists of moderating a systematically organized discussion of divergent opinions between two or more students on a topic or problem.*	
Role playing: *It consists of providing a real or simulated scenario in which students are required to assume fictitious or real roles in order to be able to deploy all their abilities to resolve conflicts, as well as to understand or experience a reality according to the role assumed.*	
Reflective dialogue: *It consists of the interaction of two participants who exchange ideas and opinions through a conversation with the purpose of reflecting critically and deeply on a specific topic. In this dynamic, students not only share their points of view, but are required to be open to listen and consider the other's perspective in order to build a more comprehensive knowledge of the topics discussed.*	
Collaborative learning: *It consists of providing instructions for students in small groups to exchange information and work on a task until all participants understand it (not necessarily equally) and have completed it.*	x
Peer learning: *It consists of promoting collaborative spaces between a pair of students who exchange their knowledge, information, experiences and problem solving, being guided by the teacher (for example: students exchange their solutions among peers, on an activity or exercise, before the teacher presents it to everyone).*	x

Active learning: *It consists of encouraging students' participation and continuous reflection through activities aimed at deepening knowledge through interaction with the content, which involves the analysis and synthesis of information.*	X
Flipped classroom: *It consists of establishing pre-class activities for the review of conceptual materials and information (e.g., through videos, infographics, readings and other teaching resources), which allows students to prepare for a practical and active classroom session through collaboration, discussion and problem solving.*	X
Experiential learning: *It consists of developing conditions for students to experience real or simulated situations (for example: debates, national or international learning visits, immersive experiences, internships, among others) that allow them to feel or perform actions and share them with their peers to strengthen their learning.*	
Service learning: *It consists of preparing students to apply the contents and tools provided by the course to the real needs of the community in order to develop a sense of social responsibility and, thus, improve their environment.*	
Spaces for creation: *It consists of facilitating physical or virtual spaces for students to create projects or prototypes based on computer programs or physical tools (for example: game labs software, design software, innovation labs, 3D printers, laser cutters, among others).*	
***Design thinking*:** *It consists of the development of solutions or products focused on user needs, through strategies and tools (e.g. empathy map, user journey, Canva, among others) that allow students to develop their empathy to understand the environment, generate ideas and solutions, as well as prototype solutions or products that can be tested and adjusted to achieve user satisfaction.*	
Problem-based learning: *It consists of a complex real-world or hypothetical problem posed by the teacher, with the intention that students (generally in groups) gather more information and analyze the problem in order to propose solutions.*	X
Research-based learning: *It consists of connecting teaching with research through the application of scientific concepts, theories and methods in order to generate new knowledge about a particular aspect of reality or the exploration of an unknown phenomenon in order to suggest theoretical or methodological guidelines for its approach.*	
Project-based learning: *It consists of the design and development of projects (generally in groups of students) for the student to manage a set of planned, interrelated and coordinated activities to achieve an objective within a given time frame.*	
Challenge-based learning: *It consists of providing a situation or general context in a social or physical environment so that students can collaboratively choose a challenge to be solved based on the learning of the contents offered by the course.*	
Gamification for learning: *It consists of developing a physical or virtual learning environment by applying the principles and elements of the game to encourage student motivation and participation.*	
Write other strategies not included in the above list that you need to detail:	

VI. Evaluation Systems

In this section, write the names of the evaluations to be used in the course, the evaluation criteria to be used in each one of them, coherently with the final learning achievement of the course, as well as the percentage of weighting that each type of evaluation will have in the final score, which must add up to 100%.

The evaluations contemplate different types of evaluations such as:

- Activity: group presentation, exposition, debate, dynamics, simulations, among others.
- Product: essay, final paper, reports, prototypes, designs, resolution tasks, case solutions, program development, among others.
- Instrument: partial exam, final exam, graded tests, reading controls, self-evaluations, questionnaires, among others.

Name of evaluation	*%*	*Criteria*	*Comments*
Quizzes	40	Quiz at the end of each unit. Each quiz allows to score max 10 points.	Internet tool used for gamified competition
Exam	60	Testing the knowledge achieved during the course	Single choice questions, internet tool

VII. References

In this section the sources and resources of information should be indicated, pointing out the required and recommended readings. It is necessary to consider that this material must be available to students and must include safe and reliable links that are unlikely to change domain, for example, DOI, handle, reliable websites, etc. Likewise, avoid considering class handouts, teacher's notes, evaluations, among other teacher's own work materials that are not referenced.

Mandatory: list the references that you consider mandatory for the course.

- **Bialowas, S. (red.) (2021)** *Experimental Design and biometric research. (free ebook),* **PUEB**
- **Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2012).** *Branding the brain: A critical review and outlook.* Journal of Consumer Psychology, 22(1), 18-36.
- **Ariely, D., & Berns, G. S. (2010).** *Neuromarketing: The hope and hype of neuroimaging in business.* Nature Reviews Neuroscience, 11(4), 284-292.
- **Krugman, D. M., Fox, R. J., Fletcher, J. E., Fischer, P. M., & Rojas, T. H. (1994).** *Do adolescents attend to warnings in cigarette advertising? An eye-tracking approach.*Journal of Advertising Research, 34(6), 39-53.

Recommended: list the references that you consider suggested for the course

- **Field, A., & Hole, G. (2003).** *How to Design and Report Experiments.* **Sage Publications, pp. 33-54.**
- **Lindstrom, M. (2010).** *Buyology: Truth and Lies About Why We Buy.* Crown Business.
- **Hubert, M., & Kenning, P. (2008).** *A current overview of consumer neuroscience.*Journal of Consumer Behaviour, 7(4-5), 272-292

VIII. Reference Schedule

The schedule is a reference for the management of the course, as well as the topics and contents that will be developed, organized in the week. It also includes the contents and activities or evaluations to be carried out, as well as the resources and materials.

Learning unit	Contents, activities, and resources	Evaluations	References
Week 1: from 03/18/2024 to 03/23/2024			
Learning unit 1:	**Contents:** ● *Foundational understanding of neuromarketing techniques and their implications.* ● *Potential and limitations of neuroimaging in marketing.* ● *Comprehensive review of consumer neuroscience methodologies* ***Activities:*** *Presentation of the topic* ***Resources:*** *Presentation, videos, Kahoot! or Quizzis*	● *Exam* ● *Quiz* ● *Presentation*	● *Plassmann, H., Ramsøy, T. Z., & Milosavljevic, M. (2012). Branding the brain: A critical review and outlook. Journal of Consumer Psychology, 22(1), 18-36.* ● *Ariely, D., & Berns, G. S. (2010). Neuromarketing: The hope and hype of neuroimaging in business. Nature Reviews Neuroscience, 11(4), 284-292.* *Recommended:* ● *Hubert, M., & Kenning, P. (2008). A current overview of consumer neuroscience.Journal of Consumer Behaviour, 7(4-5), 272-292.*
Learning unit 2:	● *Designing Sensory Experiments* ● *Methodologies and tools* ● *Between-subject and within-subject approach* ● *Field and lab experiments* ● *Case Studies and Applications* ● *Real-life examples of sensory marketing* ***Activities:*** *Presentation of the topic*	● *Exam* ● *Quiz* ● *Presentation*	● *Bialowas, S. (2021). Experimental Design and Biometric Research.PUEB (Free eBook).* ● *Spence, C. (2021). Sensehacking: How to Use the Power of Your Senses for Happier, Healthier Living. Viking.*

Learning unit	Contents, activities, and resources	Evaluations	References
	Resources: *Presentation, videos, Kahoot! or Quizzis*		
Learning unit 3:	● *Independent, dependent and control variables (1h)* ● *Pre-experiments, quasi-experiments and true-experiments (1h)* ● *Data Collection Methods (1h)* ● *Data Analysis Techniques (1h)* ● *Statistical tools and software* ● *Interpreting findings* ***Activities:*** *Presentation of the topic* ***Resources:*** *Presentation, videos, Kahoot! or Quizzis*	● *Exam* ● *Quiz* ● *Tasks (Excel)* ● *Presentation*	● *Bialowas, S. (2021). Experimental Design and Biometric Research.PUEB (Free eBook).* ● *Javor, A., Koller, M., Lee, N., Chamberlain, L., & Ransmayr, G. (2013). Neuromarketing and consumer neuroscience: Contributions to neurology. BMC Neurology, 13, 13.* ○
Learning unit 4:	● *ethical implications in consumer neuroscience.* ● *insight into the practical application of marketing findings in business strategies.* ***Activities:*** *Presentation of the topic* ***Resources:*** *Presentation, videos, Kahoot! or Quizzis*	● *Exam* ● *Discussion* ● *Quiz* ● *Presentation*	● *García, J., Rivera, L., Gonzalez-Ramirez, R., Leal, G., & Chong, M. (2018). Best practices in manufacturing processes: Experiences from Latin America. Springer.* *Recommended:* ● *Hubert, M., & Kenning, P. (2008). A current overview of consumer neuroscience. Journal of Consumer Behaviour, 7(4-5), 272-292.*

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Sylwester Białowąs - Bio

Sylwester Białowąs is an Associate Professor at the Poznań University of Economics and Business, where he heads the Department of Market Research and Services. With his expertise in experimental methods and biometric research, Prof. Białowąs is applying cutting-edge physiological measurement techniques to business and cultural economics research.

Since 2017, Prof. Białowąs has been teaching "Experiments in Social Sciences" at Poznań University of Economics and Business, with a focus on biometric research methods. His expertise in this field gained recognition when he was invited to teach the full course "Experimental Design and Biometric Research" at Osnabrück University in Germany in 2025.

Prof. Białowąs is the author of "Experimental Design and Biometric Research," a comprehensive work that addresses both theoretical foundations and practical applications of biometric methods in social sciences. In 2023, he prepared and published an online course on "Experiments in Social Sciences" in open access.

His research combines quantitative methods with biometric approaches, including the use of eye-tracking, psychophysiological measurements, and other biometric tools to understand consumer behavior, aesthetic responses, and decision-making processes. This interdisciplinary approach bridges statistics, experimental psychology, and economics, bringing new insights to both academic research and business applications.

With a background spanning statistics, marketing research, and data analysis, Prof. Białowąs continues to advance the field of biometric research in social sciences.