CENTRALE NANTES

MASTER OF SCIENCE, TECHNOLOGY AND HEALTH

2023-2024

YEAR 2

CITY AND URBAN ENVIRONMENTS

ARCHITECTURE, AMBIANCES, URBANITY

PROGRAMME SUPERVISOR(S):

Pascal JOANNE

YEAR 2 - Autumn Semester

CORE COURSES

Course code	Title	ECTS Credits
AMBI	Ambiance, Ambiances	5
CONF	Conferences	-
ENPHY1	Urban Physical Environment 1: Sun & Sound Environment	5
ENPHY2	Urban Physics Environment 2 : Wind & Microclimate	5
MEPRE	Research Methods & Practice	4
PRURB1	Urban Project 1: Theoretical Approach and Environmental Indicators	5
PRURB2	Urban Project 2: Design and Evaluation	4

LANGUAGE COURSES

Course code	Title	ECTS Credits
CCE3	Cultural and Communication English	2
ESP3	Spanish Language	2
FLE3	French Language	2

YEAR 2 - Spring Semester

CORE COURSES

Course code	Title	ECTS Credits
THESIS	Master Thesis or Internship	30

Ambiance, Ambiances [AMBI]

LEAD PROFESSOR(S): Céline DROZD / Pascal JOANNE

Objectives

This course is a general introduction to all the other teachings in the specialty. It puts in perspective the phenomena studied through a global and historical approach to environmental sensitivity. Its objective is to show the relativity of the perception of phenomena over time, the way in which they have been mastered, taken into account in urban projects and more generally in urban theories or utopias.

Course contents

It is made up of a set of thematic interventions by researchers from the two teams of the AAU laboratory, drawing on their own research work:
1 The urban environment through the prism of atmospheres
2 Aerism, air and wind in the city
3 Human ecology of urban environments
4 Miasmas and smells
5 The sounds of the city
6 Celebrations, rites and artifices
7 pedestrian accessibility to urban space
8 Film the space to think and design it
9 Sensory landscapes
10 Town planners facing the sun

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	5	30 hrs	0 hrs	0 hrs	0 hrs	2 hrs

Conferences [CONF]

LEAD PROFESSOR(S): Isabelle CALMET

Objectives

During the semester, students may be invited to attend research events taking place in Nantes (conferences, PhD defences, etc.) related with the topics covered in the course.

Course contents

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Course material

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Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
English	-	10 hrs	0 hrs	0 hrs	0 hrs	0 hrs

Urban Physical Environment 1: Sun & Sound Environment [ENPHY1]

LEAD PROFESSOR(S): Francis MIGUET / Pascal JOANNE

Objectives

This course aims to understand and analyze in order to master them, the interactions between built forms and, on the one hand, the sunshine and the lighting of the urban space, and on the other hand the phenomena of sound propagation and perception in urban space.

Course contents

Two distinct teaching modules make up this course:
▪ Sunshine and lighting
Sunshine issue from the perspective of sustainable urban development
Stakes of the urban layout - Stakes of the urban facade - Contemporary architectural and urban proposals.
Simulation, analysis and design of the sunshine of urban forms; Solar geometry - Graphic resolution methods - Algorithmic method (projection, Boolean operations on polygons) - Implementation and analysis of solar data (cartography, indicators) - Inverse approaches to sunshine - Software tools.

▪ Sound environment and urban forms
Acoustic reminders
Physical aspects of acoustic propagation: propagation models and urban forms
Perceptual aspects: urban soundscapes
Acoustic measurements, specificities of the urban environment: material, principle.
Environmental acoustics simulation software

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	5	26 hrs	4 hrs	0 hrs	0 hrs	2 hrs

Urban Physics Environment 2 : Wind & Microclimate [ENPHY2]

LEAD PROFESSOR(S): Olivier FLAMAND / Pascal JOANNE

Objectives

The object of this module is the connection between the physical parameters of the city (morphology, development, uses) and the resulting urban climate. The approaches are located both at the city level when it comes to studying the impact of urban planning on the heat island phenomenon and at the local scales when it comes to studying the comforts in outdoor spaces subject to wind phenomena.

Course contents

This course includes a series of courses and a tutorial session as part of a visit to the CSTB climatic wind tunnel.
- Basic concepts in urban climatology. Atmospheric parameters and physical processes involved. Climate data, sources and modes of analysis. Climate recalibration and urban data.
- Wind and ventilation in urban spaces
- Urban microclimatic models and simulation tools
- Climatic and energy indicators of urban forms. urban climatic effects (heat island) and the role of urban surfaces.
- Wind energy in urban areas.
- Wind measurement.
- Numerical modeling for the comfort

Course material

Bibliographies respectives et supports de cours remis par les intervenants.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	5	26 hrs	4 hrs	0 hrs	0 hrs	2 hrs

Research Methods & Practice [MEPRE]

LEAD PROFESSOR(S): Pascal JOANNE

Objectives

Know and understand the architectural and urban planning research field in France and around the world. Initiation into the methods and practice of this research on the themes of the environment and urban atmospheres.
Training in the master's internship, the writing of the dissertation and the oral defense.

Course contents

This teaching includes:

- a course on bibliographic methodology (how to read a database, find resources, query a search engine)
- A series of tutorials on research practices and preparation for the internship or research project:

1 Situation of research in France and in the world on the issues of the VEU master
2 In-situ approaches
3 Understanding of research work, preparation for a defense
4 Bibliographic parentage of an article or a book
5 interviews with a phd student
6 Invent and defend a research subject

Course material

- Personal PC for use of environmental science and built environment search engines. Bibliography software.
- ENSA Nantes catalog of master theses

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	4	6 hrs	24 hrs	0 hrs	0 hrs	2 hrs

Urban Project 1: Theoretical Approach and Environmental Indicators [PRURB1]

LEAD PROFESSOR(S): Pascal JOANNE

Objectives

Allow students to acquire or strengthen their knowledge and expertise in terms of methods of spatial and statistical analysis of national geographic reference systems, applied to the study of the phenomenon of global warming and its intensification in the city, commonly called an island of urban heat.
Teach them to implement a scientific approach which is jointly morphological, bioclimatic and adapted to the geographic data used.
Use object modeling of the interstitial geographic space, use indicators and classification methods, represent the results.

Course contents

At the crossroads of geomatics (GIS), computer-aided design for architecture (CAAD) and urban climatology, this course aims to:

▪ Introduce the phenomenon of urban heat island (UHI). To fully understand the causes of it, theoretical elements of urban climatology are presented. Then, the city is presented as a physical system made up of different urban fabrics, in which the thermo-hygro-aeraulic transfers are complex. Finally, the consequences of the local climate on health, pedestrian comfort and the functioning of energy systems in cities are discussed.
▪ Construct an object model of the interstitial geographic space (different approaches are considered: network of irregular triangles, skeletonization, isovist fields, etc.). This modeling is then used to establish correlations between the shape of urban fabrics and the urban microclimatic of the places studied (Local Climate Zones) in order to identify possible vulnerabilities.
▪ Propose methods and indicators to identify, at the scale of the urban island and for 3D digital models from national geographic reference systems, the potential for the exploitation of the solar deposit.
▪ The course application tutorials will be implemented using QGIS and SketchUp software.

Course material

▪ Benedikt, M. L. (1979) 'To take hold of space: isovists and isovist fields', Environment and Planning B: Planning and Design, 6 (1), pp. 47–65.
▪ Bouyer, J. (2009) Modélisation et simulation des microclimats urbains - Étude de l'impact de l'aménagement urbain sur les consommations énergétiques des bâtiments. Université de Nantes, ED SPIGA. https://tel.archives-ouvertes.fr/tel-00426508/document
▪ Oke. (1987) T. Boundary layer climates, 2nd Ed.
▪ Stewart, I. D., Oke, T. R. and Krayenhoff, E. S. (2014) 'Evaluation of the "local climate zone" scheme using temperature observations and model simulations', International Journal of Climatology, 34(4), pp. 1062–1080. doi: 10.1002/joc.3746.
▪ Teller, J. (2001) La régulation morphologique dans le cadre du projet urbain. Spécification d'instruments informatiques destinés à supporter les modes de régulation performantiels. Université de Liège, Belgique. http://hdl.handle.net/2268/18578.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	5	18 hrs	12 hrs	0 hrs	0 hrs	2 hrs

Urban Project 2: Design and Evaluation [PRURB2]

LEAD PROFESSOR(S): Pascal JOANNE

Objectives

The objective of this course is to provide the student with an urban project culture. The approach is more oriented towards the conceptual approach in the project than the manipulation of tools and technical knowledge.
This focus on how to "do the project" should nurture a culture of doubt rather than the transmission of established knowledge.

Course contents

The project module will take place in three stages.
A theoretical sequence (started in the "Urban Project 1" teaching course) which seeks to build a common foundation.
A practical sequence which will itself be divided into two stages: a stage of analysis and a stage of projection.

Theoretical sequence:
The theoretical approach first attempts to situate what kind of city we live in today, to understand the different planning processes that have influenced and directed our way of doing things, and then to explore the question of the project in the making of the city, both in its philosophical essence and in its making and form of communication.
This first phase is divided into three sessions: The shape of the city, The city of the third millennium, The urban project; concepts and processes.

Practical sequence:
The work will provide a critical analysis organized around three general themes / issues:
. Landscape and movement (mobility, landscape, perceptions, bio mass, transport, etc.)
. Utopias and realities.
. Density and urban forms (fragmentation, diffuse, etc.)
It is a matter of knowing the field of study, understanding its structure and assimilating its issues, then projecting general concepts. These should find avformulation on a large scale and demonstrate, on a smaller scale, the limits of their applications.
The analysis phase will be organized in teams of 4 to 6 students and into stages of exploration, formulation and reporting.
The reporting will include:
- a collective interim report of around 30 pages,
- a presentation in the form of a Power Point type projection,
- one poster per team in vertical A1 format.

Course material

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	4	0 hrs	10 hrs	20 hrs	0 hrs	2 hrs

Cultural and Communication English [CCE3]

LEAD PROFESSOR(S): David TROYA

Objectives

Team-building and Communicational English:
- Understand the general concepts of team-building
- Build a team-building project
- Understand and nurture the creative process
- Enhance self-belief and self-empowerment

Behavioral skills in an inter-cultural environment:
- Strengthen self-confidence and capacity for interaction
- Develop active listening and reformulation skills
- Develop networking skills

Course contents

Cultural and Communicational English: exercises to explore in practice the areas of culture and communication
Field-related or inter-cultural project.

Course material

Written and televised press, information and digital tools, general documents business environment and company strategies.
Internet conferences (Ted Talks, etc.), our own educational materials on Hippocampus (Moodle).

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
English	2	0 hrs	32 hrs	0 hrs	0 hrs	0 hrs

Spanish Language [ESP3]

LEAD PROFESSOR(S): Marta HERRERA

Objectives

For beginners:
Practice and reinforcement of the five skills (oral and written expression and comprehension as well as interaction)
Acquisition of vocabulary and linguistic structures
Be able to talk about yourself and those around you
Be able to express oneself during daily activities
Know how to give your opinion

For advanced students:
Practice and reinforcement of the five skills (oral and written expression and comprehension as well as interaction)
Acquisition of specialised vocabulary
Be able to understand the essential content of concrete or abstract subjects including a technical discussion
Be able to communicate spontaneously and fluently
Be able to express oneself in a clear and detailed manner, to express an opinion on a topical subject

Course contents

For beginners:
Personal environment (introduce yourself, express yourself, your tastes, your character, your hobbies, etc.), your surroundings (friends, family, location, climate), your interests (sports, leisure)
Present tense (regular and irregular)
Language patterns to express habit, obligation, "gustar" and its equivalents,
Possessive adjectives
Differences between "es", "está", "hay"
Use of "por" and "para"
Adverbs and frequency patterns
Numeral adjectives

For advanced students:
Knowledge of the Hispanic world (economic, technical, cultural and social environment)
Present tense (regular and irregular)
Imperative
Past tenses
Direct / indirect style
Future tense
Conditional tense
Present and past subjunctive moods

Course material

Preparation manuals, our own tailor-made documents, written and internet press, general civilization documents, digital tools

Assessment

Individual assessment: EVI 1 (coefficient 1)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
Spanish	2	0 hrs	32 hrs	0 hrs	0 hrs	0 hrs

French Language [FLE3]

LEAD PROFESSOR(S): Silvia ERTL

Objectives

The objective is to familiarize the learner with the French language and French culture through an entertaining task-based communicative language teaching, focused on speaking combined with:
- Phonetics
- Self-correcting exercises on our learning platform
- Learning Lab activities
- Project work
- Tutoring

Course objectives include the acquisition and reinforcement of vocabulary, syntax, and pronunciation by both traditional means and through the use of digital resources. Students will learn general French, develop language skills of oral and written comprehension and expression.

After completing this course (32 hours + personal work), the students will be able to communicate in spoken and written French, in a simple, but clear manner, on familiar topics in the context of study, hobbies etc. Another important goal of this course is to introduce the student to French culture.

At the end of the course, complete beginners can achieve an A1
level and some aspects of the A2 of The Common European Framework of Reference for Languages. More advanced students may aim for B1/B2 levels. Those who already completed the first year of the French course will be prepared for working in a French business environment.

Course contents

Two different tracks are proposed: track 1 for students newly arrived at Centrale Nantes and track 2 for students who have completed the first year of the French course. Track 1:
Full range of practical communication language exercises: reading comprehension, listening comprehension, written expression, oral expression.
Learners will be able to use the foreign language in a simple way for the following purposes:

1. Giving and obtaining factual information:
- personal information (e.g. name, address, place of origin, date of birth, education, occupation)
- non-personal information (e.g. about places and how to get there, time of day, various facilities and services, rules and regulations, opening hours, where and what to eat, etc.)

2. Establishing and maintaining social and professional contacts, particularly:
- meeting people and making acquaintances
- extending invitations and reacting to being invited
- proposing/arranging a course of action
- exchanging information, views, feelings, wishes, concerning matters of common interest, particularly those relating to personal life and circumstances, living conditions and environment, educational/occupational activities and interests, leisure activities and social life

3. Carrying out certain transactions:
- making arrangements (planning, tickets, reservations, etc.) for travel, accommodation, appointments, leisure activities
- making purchases
- ordering food and drink

Track 2:
This track follows on directly from the first-year French course, developing and completing the concepts studied thus far. The main themes are: housing, health and work. These topics will help prepare students for their future work environment. For example, housing is explored in the form of a search for accommodation upon arrival in a new city. Special workshops for CVs and cover letters, elevator pitches and job interviews.

Course material

Preparation manuals, our own tailor-made documents, written and televised press, internet, general civilization documents, digital tools, our own educational materials on Hippocampus (Moodle).

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
English	2	0 hrs	32 hrs	0 hrs	0 hrs	0 hrs

Master Thesis or Internship [THESIS]

LEAD PROFESSOR(S): Pascal JOANNE

Objectives

- Be exposed to and adapt to an industrial or research environment
- Put in practice the scientific and technical skills acquired in the previous semesters
- Strengthen interpersonal and communication skills
- Be part of or manage a project
- Organize tasks, analyze results and build deliverables

Course contents

Students should be pro-active and career-oriented in the search for their thesis/internship. The topics are validated by the program supervisor to ensure an adequate Master level. The thesis/internship is evaluated through the submission of a written report and an oral defense.

Course material

- Turabian Kate Larimore, Booth Wayne Clayton, Colomb Gregory G., Williams Joseph M., & University of Chicago press. (2013). A manual for writers of research papers, theses, and dissertations: Chicago style for students and researchers (8th edition.). Chicago (Ill.) London: University of Chicago Press.
- Bui Yvonne N. How to Write a Master's Thesis. 2nd ed. Thousand Oaks, Calif: Sage, 2014.
- Evans David G., Gruba Paul, et Zobel Justin. How to Write a Better Thesis. 3rd edition. Carlton South, Vic: Melbourne University Press, 2011.

Assessment

Individual assessment: EVI 1 (coefficient 1.0)

LANGUAGE OF INSTRUCTION	ECTS CREDITS	LECTURES	TUTORIALS	LAB	PROJECT	EXAM
French	30	0 hrs	0 hrs	0 hrs	0 hrs	0 hrs