

International master Degree in engineering in the area of structural mechanics and coupled systems.

Further your studies in a French engineering school, join our one year training program taught in English and prepare a **master degree in Engineering in the area of structural mechanics and coupled systems**.

Recognized by the French Ministry of Higher Education and Research, the diploma is awarded upon successful completion of a specialized program of study and opens the way to a professional career in an intercultural context or to further education towards the doctoral thesis.

TRAINING LOCATION: Admitted students will be trained at the engineering school of Conservatoire National des Arts et Métiers – *le Cnam*¹, located at the center of Paris.

Created in 1794, during the French Revolution on the location of a medieval monastery, *le Cnam* is a unique French institution of long-standing and deep scientific tradition. Nowadays, thanks to its integrated network, *le Cnam* spreads higher adult education and life-long training to 100 000 students in France and abroad.

Le Cnam holds 25 research teams and offers 36 doctoral programs in a variety of disciplines strongly oriented toward technological research.

Le Cnam engineering school² - *Eicnam* - delivers each year 1,000 engineering degrees in 24 specialized fields related to industrial science and information technology.



We teach everyone everywhere

THE TEACHING TEAM: All the teachers involved in the program are members of the Structural Mechanics and Coupled Systems laboratory (LMSSC³). The LMSSC is internationally recognized for its expertise in :

- Linear and non-linear structural dynamics
- Fluid-structure interaction and vibro-acoustics
- Smart structures and interfaces
- Source identification and noise control

ADMISSION AND PROGRAM OVERVIEW: After successful completing their first year master degree program in their home country, students from partner universities may get additional experience and a double diploma by complementing their studies for one year in Paris, France.

After one semester classes, they will do an internship in a company to work as part of a project team.

A contribution to a research project conducted in collaboration with their home university may, if required, complete the student's training in France.

CONTACTS (INFORMATION AND APPLICATION) :

- Professor Jean-François Deü, (jean-francois.deu@cnam.fr), Cnam professor, researcher at Lmssc, in charge of master program.
- Julie Marbot, (julie.marbot_amelineau@cnam.fr +33 1 58 80 86 97), International program development at *le Cnam* engineering school

FIND OUT MORE:

- (1) <http://the.cnam.eu/>
- (2) <http://ecole-ingenieur.cnam.fr/>
- (3) www.cnam.fr/lmssc

PROFESSIONAL OPPORTUNITIES: This training offers possibilities to start a career in line with the changing world of mechanics in the broad sense. Indeed, the wide use of composite materials in transportation industry associated to performance and dependability demands require the design of innovative mechanical structures of increasing complexity. Emerging problems in the field of mechanics (e.g. vibration control and fluid-structure interaction) require multidisciplinary approaches to develop test scenarios and ensure the reliability of structures designed and validated in a numerical environment.

Main features: The Master in structural mechanics and coupled systems relies on the research and teaching environment of *le Cnam's* engineering school. It aims at acquiring thorough knowledge of structural dynamics, materials and coupled systems. French as a foreign language courses as well as teachings about company organization allows developing the inter-cultural skills of the students.

MASTER'S SYLLABUS: 800 hours

October to march

Non-linear structural mechanics: A mechanical system subjected to large strains or stresses generally has a non-linear behaviour. These non-linearities are of various types: geometric, material, contacts... The numerical simulation of these phenomena requires the knowledge of specific mathematical tools as well as related resolution algorithm.

Fluid-structure interaction: This theme is focused on coupled phenomena involving a vibrating structure containing an internal liquid/gas or immersed in a surrounding fluid. The accuracy of related numerical simulations strongly depends on the modelling of the coupled system as well as methods and algorithms developed for its resolution. The main objective is to acquire a solid methodological background and deep insights on a field with high stakes in terms of competitiveness (costs and performances).

Structural dynamics: To design complex mechanical systems, it is crucial to consider the vibration environment of the structure. Indeed, vibrations can be at the root of noise, premature wear of a structure or its ruin. Understanding the underlying mechanisms of the vibration behaviour of a structure (resonance, damping...) are fundamental in an industrial context. The study of vibrations has applications in transportation industries (aerodynamic instabilities, satellite's resistance to loads...) or in civil engineering (resistance of buildings to earthquake ...).

Engineers at work: To widen one's horizon through conferences of skilled engineers sharing their experience. Scientific, societal, environmental, legal issues in a globalizing world that one faces as part of his professional responsibilities. Project management issues and project culture in companies.

Model and representation of the organization: get prepared to analyze and participate to a process of organizational management. Acquire skills to take an active part in companies and evolve within them or other organizations in the economic system.

French as a Foreign Language: develop the five skills of the Common European Framework of Reference for Languages – CEFRL: speaking in a conversation and continuously, writing, listening and reading. Emphasis is also placed on the development of intercultural competence.

Supervised personal project: undertake a professional and/or research project to prepare for business and/or research internship.

From april on

Internship: a professional mission in a company will be supervised by a double-tutoring (*le Cnam* teacher and company engineer): as a team member, students will exert their skills and acquire new ones, learn methods and know-how specific to the project culture. Students who wish to acquire research experience may undertake afterwards a second internship within the department research team (under conditions).

Defense of master's thesis: The internship's based report will be defended before a jury composed of professors (both from *le Cnam* and partner university) and tutor from the company.

Subject Title: The Finite Element Method for Structures

Objectives

This subject provides students with:

- A general knowledge of the finite element method for the computation of structure in the case of linear static;
- Practice in applying the theories, concepts and techniques acquired during lectures through commercial code use in a first step and programming the method using a modern language.

Intended Learning Outcomes

Upon completion of the subject, students will be able to (Professional/academic knowledge and skills):

- (a) Understand the basis of the finite element method;
- (b) Understand the drawbacks;
- (c) Acquire concepts in programming the method;
- (d) Analyse the results.

Subject Syllabus

1. Weak form of the static equations
 - admissible kinematic space
 - admissible static space
 - variational form of the equations using a virtual displacement and energy theorems
 - Voigt notations
2. Space vector of the finite element discretization
 - basis functions
 - shape function matrix
3. Discretized system
 - stiffness matrix
 - resolution of the linear system
4. Elemental techniques
 - reference element
 - numerical integration and quadrature rules
5. Post-treatment
 - computation of a smooth stress field
 - a posteriori error estimator (ZZ2)
6. Structure elements
 - rod and beam elements
 - plate elements
 - extension to shell elements
7. Notions of programming the finite element method (for example with Python)

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Assignments	10	✓	✓				
2. Lab exercises	10	✓	✓				
3. Project	30	✓	✓	✓	✓		
4. Mid-term	20	✓	✓		✓		
5. Examination	30	✓	✓		✓		

Student Study Effort Required

Class contact	
●Lecture	14 hrs.
●Tutorial	14 hrs.
●Practical works	7 hrs.
Other student study effort	
●Examination	3 hrs.
Total student study effort	38 hrs.

Reading List and References

1. O.C. Zienkiewicz, The Finite Element Method, Mc Graw Hill, 1991.
2. Thomas J. R. Hughes, The Finite Element Method: Linear Static and Dynamic Finite Element Analysis (Dover Civil and Mechanical Engineering), 2000.
3. Carlos A. Felippa, Introduction to Finite Element Methods (University of Colorado, Boulder).

Url: <http://www.colorado.edu/engineering/CAS/courses.d/IFEM.d/Home.html>

SUBJECT TITLE: INTRODUCTION TO CONTINUUM MECHANICS

Objectives

- To study the conservation principles in the mechanics of continua and formulate the equations that describe the motion and mechanical behaviours of continuum materials,
- To present the applications of these equations to simple problems associated with solid and fluid mechanics
- To provide advanced treatment of the fundamental, unifying concepts of the mechanics of continua in order to facilitate further study in specialized fields such as aerodynamics, mechanics of viscous fluids, elasticity, plasticity, and continuum damage mechanics.

Intended Learning Outcomes

Upon completion of the subject, students will be able to (Professional/academic knowledge and skills):

- (a) Describe motion and deformation of body;
- (b) Master different strain measures and how and where to use them;
- (c) Restate simple problems - involving, e.g., stresses, deformation and/or flow - in continuum mechanics terms
- (d) Solve simple continuum mechanics problems using analytical methods.

Subject Syllabus

1. Definition of Strain, Eulerian and Lagrangian Coordinate Systems, Polar Decomposition , Theorem, Rate of Deformation, Principal Strain, and Linear Compatibility Equations.
2. Definition of Stress, Cauchy and Nominal Stresses; Balance Laws: Mass, Linear and Angular Momentum, Energy; Principal stresses, Deviatoric and Hydrostatic Stress;
3. First and Second Laws of Thermodynamics for a Continuum; Equations of State;
4. Fundamentals of Linear Elastic Behavior of Solids, Material Symmetries,
5. Fundamentals of Newtonian Fluids, Inviscid and Viscous Compressible Flow; Navier-Stokes Equations, Ideal and Rotational Flows.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Assignments	20						
4. Mid-term	30		✓		✓		
5. Examination	50		✓		✓		

Student Study Effort Required

Class contact	
●Lecture	14 hrs.
●Tutorial	14 hrs.
●Practical works	7 hrs.
Other student study effort	
●Examination	3 hrs.
Total student study effort	38 hrs.

Reading List and References

- 1.Fung, Y.C. (1994) – A First Course in Continuum Mechanics. 3rd ed. Prentice
- 2.Hjelmstad, K.D. (1997) – Fundamentals of Structural Mechanics. Prentice Hall, Upper Saddle River, N.J.
- 3.Mase, G.E. (1970) – Theory and problems of Continuum Mechanics, Schaum's outline series. McGraw-Hill, New York.
- 4.Timoshenko, S. & Goodier, J.N. (1951) – Theory of Elasticity. Mac Graw-Hill, New York.

SUBJECT TITLE: FLUID STRUCTURE INTERACTION & VIBROACOUSTICS

Objectives

This subject provides students with:

- a basic knowledge of the equations of acoustics
- a general knowledge of the modeling vibroacoustic problems;
- the skills to understand and analyze the main physical phenomena
- practice on commercial softwares

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

- (a) acquire the main concepts at the basis of vibroacoustics;
- (b) state a vibroacoustic problem;
- (c) solve a vibroacoustic problem analytically and numerically;
- (d) use commercial softwares to real engineering systems;
- (e) communicate in writing with technical report during the practical works sessions.

Subject Syllabus

1. Equations of linear acoustics

- Assumptions of linear acoustics
- Classical form of the wave equation
- Sound speed
- Simple solutions of the wave equations – plane waves and spherical waves
- Boundary conditions
- Conservation law of acoustic energy
- Acoustic intensity and radiated acoustic power

2. Vibroacoustic coupling

- Radiation of a rigid piston in a 1D waveguide
 - * Acoustic impedance
 - * Acoustic intensity and radiated acoustic power
 - * Radiation efficiency
- Radiation of a plate into an acoustic cavity
 - * Modal approach
 - * Strong/weak coupling

3. Application of the Finite Element Method (FEM) to vibroacoustics

- Problem statement
- Strong and weak forms of the vibroacoustic equations
- Finite element discretization
- Examples

4. Introduction to the Boundary Element Method

- Integral formulation of acoustic radiation problems
 - * General principle
 - * Green's function
 - * Sound radiation of a vibrating body in an infinite space

- * Sound radiation of a body in a closed space
- * Particular case: Rayleigh's integral
- Boundary Element Method (BEM)
 - * Discretization of the problem
 - * Variational approach
 - * Collocation method
 - * Technical aspects (discretization criterion, element normal, irregular frequencies)
 - * FEM/BEM coupling

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				
		a	b	c	d	e
1. Assignments	10	✓	✓	✓		
2. Practical works	40		✓	✓	✓	✓
3. Examination	50	✓	✓	✓		

Student Study Effort Required

Class contact	
●Lecture	14 hrs.
●Tutorial	14 hrs.
●Practical works	7 hrs.
Other student study effort	
●Examination	3 hrs.
Total student study effort	38 hrs.

Reading List and References

1. F. Fahy and P. Gardonio. Sound and structural vibration, Second Edition. Academic Press. 2007
2. M. Bruneau. Fundamentals of Acoustics. ISTE. 2006

SUBJECT TITLE: NONLINEAR STRUCTURAL MECHANICS

Objectives

This subject provides students with:

- a knowledge and understanding of nonlinear structural mechanics including geometrical nonlinearity, physical nonlinearity, nonlinear boundary conditions and coupled problems ;
- a general knowledge of resolution methods for the solution of nonlinear equation systems and explicit and implicit algorithms for time dependent problems.
- an ability to use finite element methods to analyze nonlinear problems;
- basic understanding of stability of structures.

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

- (a) State a structural nonlinear problem;
- (b) Solve simple nonlinear static problems analytically or numerically;
- (c) Identify the appropriate method of resolution of a nonlinear problem;
- (d) Analyze results from finite element models;
- (e) Communicate in writing with technical report during the practical works sessions.

Subject Syllabus

1. Kinematics
 - Motion and Deformation Gradient
 - Strain Measures
 - Material Time Derivatives
2. Stress and equilibrium
 - Introduction of Different Stress Tensors
 - Time Derivatives of Stress Tensors
 - Weak Form of Equilibrium, Variational Principles
3. Constitutive Equations
 - Hyperelasticity
 - Visco-Elastic Material Behaviour
 - Elasto-Plastic Material Laws
4. Solution Methods for Time Independent Problems
 - Solution of Nonlinear Systems of Equations (Newton-Raphson Method)
 - Path-Following or Arc-Length Method
 - Examples of Algorithms
5. Solution Methods for Time Dependent Problems
 - Explicit Time Integration Methods
 - Implicit Time Integration Methods
 - Numerical Examples

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				
		a	b	c	d	e
1. Assignments	10	✓	✓	✓		
2. Practical works	30		✓	✓	✓	✓
3. Examination	60	✓	✓	✓		

Student Study Effort Required

Class contact	
●Lecture	14 hrs.
●Tutorial	14 hrs.
●Practical works	7 hrs.
Other student study effort	
●Examination	3 hrs.
Total student study effort	38 hrs.

Reading List and References

- 1.M.A. Crisfield, *Non-linear Finite Element Analysis of Solids and Structures*, Wiley, 1991.
- 2.T. Belytschko, W.K. Lui, and B. Moran, *Nonlinear Finite Elements for Continua and Structures*, Wiley, 2000.
- 3.J. Bonet, R.D. Wood, *Nonlinear Continuum Mechanics for Finite Element Analysis*, 2nd Edition, Cambridge University Press, 2008.
- 4.P. Wriggers, *Nonlinear Finite Element Methods*, Springer, 2008.

SUBJECT TITLE: STRUCTURAL DYNAMICS

Objectives

This subject provides students with:

- a knowledge and understanding of structural dynamics including multi-degree-of-freedom systems, continuous systems and finite element systems
- a general knowledge of direct time integration methods and a few reduction methods
- an ability to use finite element methods to analyse structural vibrations
- basic understanding of experimental modal analysis.

Intended Learning Outcomes

Upon completion of the subject, students will be able to:

- (a) state a dynamic problem;
- (b) solve a dynamic problem analytically or numerically, both in the frequency and the time domain;
- (c) identify the appropriate method of resolution of a dynamic problem;
- (d) analyse dynamic results from finite element models and field measurements;
- (e) communicate in writing with technical report during the practical works sessions.

Subject Syllabus

1. Vibrations of n-degree-of-freedom systems
 - Equations to study the free and forced vibrations of damped and undamped systems
 - Main characteristics of vibrations (mode shapes, Eigen frequency, modal damping, ...)
 - Definition of the frequency response function
 - Rayleigh-Ritz method (modal superposition method)
2. Continuous systems
 - Kinematic description of the dynamic behavior of continuous systems
 - Transverse vibrations of beams
3. Application of the Finite Element Method (FEM) to structural dynamics
 - Finite element discretization
 - Computation of the solution of an Eigen problem
 - Direct computation and modal approximations of the structural dynamic response
 - (Dynamic substructuring (Craig-Bampton method))
4. Time-integration methods
 - Numerical schemes to compute the time-domain response of a structure (finite differences, Newmark-schemes, ...)
 - Analysis of the precision and the stability of numerical schemes
5. Experimental modal analysis
 - Actuators and sensors for the measurement of structural dynamic responses
 - Identification methods of modal parameters (half bandwidth method, Nyquist circle fit,...)
 - Assessment criteria between a numerical model and experiments (modal assurance criterion, frequency response assurance criterion)

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed				
		a	b	c	d	e
1. Assignments	10	✓	✓	✓		
2. Practical works	30		✓	✓	✓	✓
3. Examination	60	✓	✓	✓		

Student Study Effort Required

Class contact	
●Lecture	14 hrs.
●Tutorial	14 hrs.
●Practical works	7 hrs.
Other student study effort	
●Examination	3 hrs.
Total student study effort	38 hrs.

Reading List and References

1. M. Géradin and D.J. Rixen, Mechanical vibrations: theory and application to structural dynamics, John Wiley & Sons, Ltd.
2. D.J. Ewins, Modal Testing: theory, practice and application, John Wiley & Sons, Ltd.

COURSE: STRUCTURAL MODELING AND ANALYSIS

Objectives:

This course provides some tools and methods for analyzing and modeling structures. The course will introduce some methods for dealing with complex structures and various kind of loading. The idea will be to achieve some simple calculations for helping to solve mechanical problems analytically.

In order to do this, the course will focus on many subjects:

- Modeling loads using local and global description. Use of the screw theory. Static equilibrium.
- Beam theory for straight and non-straight beams: generalized internal force and torque
- Tension, torsion, bending of beams and combination of these simple states
- Calculation of the displacement and rotation of the section of the beam
- Euler-Bernoulli and Timoshenko theories
- Methods for solving hyperstatic problems using strain energy
- Buckling of straight beams.
- Calculation of the stress for a beam problem and application of mechanical criteria

Intended Learning Outcomes

Upon completion of the course, students will be able to:

1. Modeling structural mechanical problems using beams
2. Analyze beams problems
3. Solving beams problems on straight and non-straight beams
4. Dealing with hyperstatism
5. Evaluating the local stress and strength on the sections of a beam
6. Knowing the limits and the drawbacks of the beam theory
7. Solving complex beams structures using mechanical software

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed						
		1	2	3	4	5	6	7
1. Project	20	✓	✓				✓	✓
2. Homework	20	✓	✓	✓	✓	✓		
5. Examination	60	✓	✓	✓	✓	✓	✓	

Student Study Effort Required

Class contact	
●Lecture	15 hrs.
●Tutorial	15 hrs.
Other student study effort	
●Work on assignments and project; study related material/ team work	30 hrs.
●Study for mid-term and examination	10 hrs.
Total student study effort	70 hrs.

Reading List and References

- 1.Madhukar Vable, Mechanics of Materials, Oxford University Press, 2002-2009, ISBN:0-19-513337-4
- 2.Russell C. Hibbeler, Mechanics of Materials, 9TH Edition, Pearson Education Centre, 2013, ISBN-10: 9332518602
- 3.Russell C. Hibbeler, Engineering Mechanics: Statics (13th Edition), Prentice Hall, 2012, ISBN-10: 0132915545

SUBJECT TITLE: FRENCH AS A FOREIGN LANGUAGE

Objectives

At the end of this course, students who have a way stage level in French (A2 of the Common European Framework for Languages) will have an intermediate level (B1 of the Common European Framework for Languages). At this level, students are able to

- understand the main points of clear standard input on familiar matters regularly encountered in work, university, leisure, etc.
- deal with most situations likely to arise whilst travelling in an area where the language is spoken.
- produce simple connected text on topics which are familiar or of personal interest.
- describe experiences and events, dreams, hopes and ambitions and briefly give reasons and explanations for opinions and plans.

Intended Learning Outcomes

Upon completion of the course, students will be able to:

- OVERALL ORAL PRODUCTION:** reasonably fluently sustain a straightforward description of one of a variety of subjects within his/her field of interest; briefly give reasons and explanations for opinions, plans and actions; generally follow the main points of extended discussion with native speakers; exploit a wide range of simple language to deal with most situations likely to arise whilst travelling; enter unprepared into conversation on familiar topics, express personal opinions and exchange information on topics that are familiar; enter unprepared into conversations on familiar topics.
- SUSTAINED MONOLOGUE:** give a prepared straightforward presentation on a familiar topic within his/her field which is clear enough to be followed without difficulty most of the time; take follow up questions, but may have to ask for repetition if the speech was rapid.
- OVERALL WRITTEN PRODUCTION:** Can write straightforward connected texts on a range of familiar subjects within his field of interest; Can write short, simple essays on topics of interest; summarize, report and give his/her opinion about accumulated factual information on familiar routine and non-routine matters within his/her field with some confidence. Can write personal and formal mails; an take notes as a list of key points during a straightforward lecture, provided the topic is familiar, and the talk is both formulated in simple language and delivered in clearly articulated standard speech.
- OVERALL LISTENING COMPREHENSION:** Can understand straightforward factual information about common every day or job related topics, identifying both general messages and specific details, provided speech is clearly articulated in a generally familiar accent; follow a lecture or talk within his/her own field, provided the subject matter is familiar and the presentation straightforward and clearly structured. Can understand the main points of radio news bulletins and simpler recorded material about familiar subjects delivered relatively slowly and clearly; follow many films in which visuals and action carry much of the storyline, and which are delivered clearly in straightforward language.

- (e) OVERALL READING COMPREHENSION: read straightforward factual texts on subjects related to his/her field and interest with a satisfactory level of comprehension; scan longer texts in order to locate desired information, and gather information from different parts of a text, or from different texts in order to fulfil a specific task.
- (f) INTERCULTURAL HABILITIES: capacity to fulfil the role of cultural intermediary between one's own culture and the foreign culture and to deal effectively with intercultural misunderstanding and conflict situations; the ability to overcome stereotyped relationships.

Subject Syllabus

1. Lexical competence.
2. Grammatical competence.
3. Phonological competence.
4. Orthographic competence.
5. Sociolinguistic competence (politeness conventions, register differences, etc.).
6. Knowledge of the society and culture.

Assessment Methods in Alignment with Intended Learning Outcomes

Continuous assessment with an every week task to do (50 %)
DELF B1 at the end of the semester (50 %)

Student Study Effort Required

Study effort: 2 hours / week

Reading List and References

Learn with online resources: <http://langues.cnam.fr/ressources-pedagogiques/travailler-le-fle>

SUBJECT TITLE: INDIVIDUALLY-TAILORED LEARNING PROGRAM IN ENGLISH

Subject code: ANG001 (1st semester) – 15 weeks – 6 credits/ECTS
ANG002 (2nd semester) – 15 weeks – 6 credits/ECTS

NB: Students can either choose to follow ANG001 or ANG002, or decide to follow both modules

Objectives

Allow students to improve their English skills by working at their own pace and convenience with the help of a personal language coach.

Intended learning outcomes

This program will allow students to:

- Consolidate and expand their general language skills or focus on specialized fields.
- Train for Bulats or other official English tests.
- Focus their language practice on specific needs such as:
 - ✓ Preparing for a job interview
 - ✓ Making presentations
 - ✓ Writing emails
 - ✓ Building confidence on the phone
 - ✓ Understanding scientific journals
 - ✓ Reading the press and/or understanding news reports
 - ✓ Writing reports
 - ✓ Debating

Subject syllabus

A learning program tailored to students' needs

- This personalized learning program is tailored to suit students' specific needs and requirements. It allows students to work at their own pace, either at the Cnam's Language Resource Center or at a location of their choice.
- Students can use a large selection of training material, including those available at the resource center, which can be borrowed for more flexibility.

Personalized guidance and follow-up

- Regular follow-up is ensured by one-to-one sessions with a personal language coach : a total of 5 hours per module is dedicated to helping each student identify his/her language needs, define learning goals, set priorities and assess his/her own progress in learning.
- During each session coach assists student in planning and organizing his/her study-time while providing useful guidance in selecting appropriate learning material and building up learning techniques.
- Between each session student works in autonomy and uses a diary to keep track of all his/her activities, document his/her own learning process and note down all issues which need to be discussed with coach.

The learner's diary is an efficient tool to reinforce students learning skills, as it helps students assess their activity and learning progress and difficulties while working their way through the module.

Language activities and learning materials

- Regular conversation groups with native English speakers and role-play activities are included.
- Varied learning material is provided: self-study course books, articles, recordings, videos, online resources, authentic material such as films and novels.

Student study effort required to validate module

Activity	Minimum	Recommended
One-to-one sessions with coach	5 hours	5 hours
Conversation groups and role play activities	5 hours	10 hours
Personal work	30 hours	40 hours
Total student study effort required	40 hours	55 hours

Assessment methods

Throughout this module, with the help of his personal coach, student will learn how to use various types of exercises to assess his/her own progress in the language and develop self-assessment skills.

Materials such as recordings of his/her speaking production as well as written work can also be used to assess his/her skills and progress.