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ANNEE : 1ère année / 1st year - 60 ECTS

SEMESTRE : 1er semestre / 1st semester - 30 ECTS

UE : Humanités/Humanities - 6 ECTS

EC : Cultures. Sciences. Sociétés 1 / Cultures, Sciences, Societies 1 - 4 ECTS EC : Anglais INSAVENIR (0 S1) - undefined ECTS

UE : Physique et outils logiciels/Physics and software tools - 7 ECTS

EC : Systèmes et Outils Logiciels / Sytems and Software Tools - 2 ECTS EC : Physique 1 / Physics 1 - 5 ECTS

UE : Mathématiques et outils de calculs/ Mathmatics and calculation tools - 7 ECTS EC : Mathématiques S1 / Maths 1 - 4 ECTS

EC : Outils mathématiques et numériques pour l'ingénieur(e) 1 /Mathematical and Numerical Tools for Engineering 1 - \* ECTS

UE : Enseignement transversal/Transversal teaching - 10 ECTS

EC : projet S1/project S1 - ECTS

- SEMESTRE : 2ème semestre / 2nd semester 30 ECTS
  - UE : Humanités/Humanities 5 ECTS

EC : Connaissance de l'entreprise / Company knowledge - ECTS

EC : Anglais INSAVENIR (0 S2) / English INSAVENIR - - ECTS

UE : Physique et chimie/ Physics and chemistry - 8 ECTS

EC : Physique 2 / Physics 2 - 5 ECTS

EC : Chimie /chemistry - 3 ECTS

UE : Mathématiques et outils de calculs/ Mathmatics and calculation tools - 8 ECTS

EC : Outils mathématiques et numériques pour l'ingénieur(e) 2 / Mathematical and Numerical Tools for Engineering 2 - \* ECTS

EC : Mathématiques S2 / Maths 2 - 5 ECTS

UE : Enseignement transversal/Transversal teaching - 9 ECTS

EC : projet S2/project S2 - ECTS



#### Domaine Scientifique de la DOUA 20 Avenue Albert Einstein - 69100 VILLEURBANNE

## **IDENTIFICATION**

#### CODE : AVE0-1-S1-EC-CSS ECTS : 4 HOURS Cours : 0h TD: 46h TP: 0h Projet : 0h 0h Evaluation : Face à face pédagogique : 46h 40h Travail personnel : Total : 86h ASSESMENT METHOD

- A continuous assessment section including the following exercises: presentation of a talk in a small group

- individual presentations

Individual pleading for the eloquence competition (written and oral presentation).

TEACHING AIDS

## TEACHING LANGUAGE

French

#### CONTACT

M. Bousquet Philippe : philippe.bousquet@insa-lyon.fr

#### AIMS

#### Humanities framework:

CT2 - WORK, LEARN, EVOLVE IN AN AUTONOMOUS WAY

- 2.3 Acquire new skills on one's own, by seeking out the necessary resources
- 2.4 Exercise one's critical faculties, think for oneself

CT3 - INTERACT WITH OTHERS, WORK IN A TEAM 3.1 - Communicate appropriately: convey a message, listen, show empathy, assert one's point of view, debate in a well-argued way

3. 2 - Situate one's original discourse with explicit references

3.3 - Communicate non-verbally: posture and gestures CT5 - ACT RESPONSIBLY IN A COMPLEX WORLD 5.1 - Understand the complex issues (in the company and in society) facing the engineer: grasp their social, societal, political, economic, environmental, ethical and philosophical dimensions.

5.2 - Integrate a responsible dimension (deontology, ethics) into their actions; identify, evaluate and anticipate the consequences of their actions and decisions at different levels of scale.

## CONTENT

- Notions of rhetoric and argumentation
- Written and oral communication exercises
- Reflections, positions, debates
- Participation in an eloquence contest

## BIBLIOGRAPHY

List of books recommended by the teacher at the beginning of the year, according to the subjects covered.

## **PRE-REQUISITES**

These are the achievements of secondary education: the ability to appropriate information, correctness of language, logic of thought, intellectual curiosity, the ability to conceptualize a problem and grasp its implications, to reflect...







# Centre des Humanités

Domaine Scientifique de la DOUA 20 Avenue Albert Einstein - 69100 VILLEURBANNE

**Foreign Languages** 

# IDENTIFICATION

CODE : HU-0-S1-EC-L-ANG-AVE		
ECTS : undefined		
HOURS		
Cours :	0h	
TD :	24h	
TP :	0h	
Projet :	0h	
Evaluation :	0h	
Face à face pédagogique :	24h	
Travail personnel :	0h	
Total :	24h	
ASSESMENT METHOD		

Continuous assessment in line with the skills to be validated

TEACHING AIDS

-Teaching documents are chosen by the instructor according to the target level: -Various instructional and authentic English-language materials

-Audio-visual documents

TEACHING LANGUAGE

English

CONTACT

M. ELIARD Krystyna : krystyna.irvine@insa-lyon.fr Mme TREMOUILHAC Erin : erin.tremouilhac@insa-lyon.fr

# AIMS

Consolidate, acquire, and enrich linguistic knowledge and skills by working on the skills defined by the Common European Framework of Reference for Languages. To consolidate, acquire, and enrich linguistic knowledge and skills by developing the competences defined by the Common European Framework of Reference for Languages. Students are divided into groups based on level, and specific linguistic objectives are determined according to the student's level.

This course contributes to the transversal competence CT7.1, Communicate in foreign languages.

## CONTENT

In order to develop the defined learning outcomes, the course will employ language activities that are varied (written comprehension and expression, oral comprehension and expression, oral interaction) and complex (projects, simulations, etc.).

The activities are designed to promote maximum language exposure and the use of the target language as a vehicle of culture and as a tool for work and communication.

The student will become more autonomous through group work and personal work.

## **BIBLIOGRAPHY**

The Common European Framework of Reference for Languages, Council of Europe

## **PRE-REQUISITES**

none







#### Domaine Scientifique de la DOUA 20 Avenue Albert Éinstein - 69100 VILLEURBANNE

# **IDENTIFICATION**

CODE :	AVE0-1-S1-EC-S	OL	
ECTS :		2	
	HOURS		
Cours :		2h	
TD :	1	3h	
TP :		0h	
Projet :		0h	
Evaluation 0	.01666666666666666	66h	
Face à face pédagogique	15.016666666 e :	66666	66h
Travail perso	onnel : 1	5h	
Total :	30.01666666666666	6h	
ASSES	MENT METHOD		

# Continuous monitoring

**TEACHING AIDS** 

Various (Poly, supports TD slideshows, subjects, corrections), all available on the establishment's educational platform: Moodle.

TEACHING LANGUAGE

#### French

CONTACT

M. Stouls Nicolas : nicolas.stouls@insa-lyon.fr M. Pruvost Sébastien : sebastien.pruvost@insa-lyon.fr M. Rivano Hervé : herve.rivano@insa-lyon.fr

## AIMS

Targeted Learning Outcomes (AAv):

AAv0.1: At the end of S1, students are able to write a scientific report using basic office software functions.

AAv0.2: At the end of S1, students are able to independently conduct digital intelligence to develop their digital literacy, particularly through Pix courses.

## CONTENT

\* Spreadsheets:

- + 2 Tools: LibreOffice Calc and Excel
- + Elementary skills : formulas, relative/absolute references
- + Graph plots : relevant choice, regressions, error bars
- + GRG Solver
- \* Word processor :
- + 2 tools: Word and HedgeDoc (Markdown)
- + Elementary skills: style sheet, models, figures, references, tables of contents
- + Latex equations
- \* General culture : + INSA digital environment
- + Architecture of a computer
- + Operating system
- + Security + Bash command line
- + Environmental impact of digital

In particular, 2 Pix courses are used to prepare or complete homework themes.

#### **BIBLIOGRAPHY**

Computer science and digital sciences, Dowek et al., Eyrolles editions (2012) - chapters 7, 10, 13, 14, 15 and 18.

## **PRE-REQUISITES**

Know how to use a computer.







CODE :	AVE0-1-S1-	EC-PH
ECTS :		5
	HOURS	
Cours :		4h
TD :		26.5h
TP :		12h
Projet :		0h
Evaluation :		0h
Face à face	pédagogique :	42.5h
Travail perse	onnel :	45h
Total :		87.5h
ASSES	MENT METHO	D

Continuous assessment all along the school semester to check acquired knowledge and skills by

tests and practical exams. A final exam will be held at the end of the school semester to evaluate the ability to analyze and solve a problem using the knowledge and skills acquired during the whole vear.

#### TEACHING AIDS

Textbooks with lecture notes, problems exercises and for tutorials and practicals wordings. Multiple-choice questionnaire for autonomous training and selfassessment are available (French only).

**TEACHING LANGUAGE** 

#### French

CONTACT

M. de Sainte Foy Hugues : hugues.de-sainte-foy@insa-lyon.fr M. Roggero Aurélien : aurelien.roggero@insa-lyon.fr Mme Sonneville Camille : camille.sonneville@insa-lyon.fr

#### AIMS

Targeted learning outcomes (TLA) :

AAv.1 Apply the different stages of the methodology for solving a simple open problem. AAv.2 Formulate a literal expression and check its consistency. AAv.3 Express accurately a numerical result with its unit, its uncertainty using the

appropriate number of significant figures and in any system of units. AAv.4 Construct and use a graphical representation of physical quantities.

AAv.5 Make a circuit from a diagram and vice versa, and model a 1st order continuous or transient electrical circuit.

AAv.6 Determine currents, voltages and energy quantities in a 1st order continuous or transient circuit from the characteristics of the components.

## CONTENT

Electrodynamics (macroscopic): linear and non-linear dipoles (these latter ones are only studied through their I-V curves); properties of coils and capacitors; direct current in a 2meshes circuit (Kirchhoff's circuit laws, Thévenin's and Norton's theorems); the transient state (first order circuits).

## **BIBLIOGRAPHY**

All physics books written for first undergraduate cycle.

#### **PRE-REQUISITES**

Notions learnt during secondary education: calculus, plane geometry, and trigonometric functions, calculation skills (derivatives, anti-derivatives, quadratic equations, systems of linear equations, trigonometry, ...). Statistics (average and standard deviation), data and functions plots.

This teaching will also use the mathematical tools and skills that will be learnt all along the school year.









CODE :	AVE0-1-S1-	EC-MA
ECTS :		4
	HOURS	
Cours :		10h
TD :		22.25h
TP :		0h
Projet :		0h
Evaluation :		2.75h
Face à face	pédagogique :	35h
Travail perso	onnel :	35h
Total :		70h
ASSES	MENT METHO	

The evaluation includes weekly questionnaires (coefficient 0.25 for all the period) 4 oral test (coefficient 0.25 each), 3 written tests 2h (Coefficient 1 each ) and 1 final test 3h ( coefficient 1.5 ) By group, realisation of a scientifc poster (Coefficient 0.3)

TEACHING AIDS

each student , in The Moodle web site (group 30) , can find a digital version of the analysis book, algebra exercises and QCM Training and the test (+ subjects and correcteion) of the previous years.

TEACHING LANGUAGE

French

#### CONTACT

M. patrick BOUVIER : patrick.bouvier@insa-lyon.fr

#### AIMS

The S1 is devoted to the study of functions of real variable begun in high school. The engineering student will learn to master new computation techniques from which he will deduce qualitative information on functions. Linear algebra was also learn, in which the student will be indulged in handling some more abstract mathematical objects than he encountered so far.

- In this framework, students will deepen their ability to:
- C11 Break down a problem into a set of interacting sub-parts
- C14 Build a sketch adapted to a context
- C15 Identify issues or action objectives.
- C16 Build a proof.
- C25 Use algebraic and numerical computation techniques.

C55 - Make a synthesis of intermediate results in response to questioning. C62 - Make a reasoned solution respecting a balance between everyday language and

symbolic language.

This EC appears in the Unité d'Enseignement Sciences Pures.

It contributes to the following abilities in Engeneer School :

- C1 analyse a system or issue
- C2 Exploit a Real or Virtual system Model
- C6 Communicate an analysis, a scientific path, in an argued and ogical discussion
- C24 To implement scenarii to verify results coming from modelization
- C54 Results interpretation

C61 - To structure a speech associated to a logical and argued reasoning, aiming at clearly identified objectives

#### CONTENT

- Analyses
- Sum and Product Symbols; Binomial Theorem,
- Based of mathematic analysis
- Tools for the study of functions and sequences:
- Linear differential equations (part 1).
- Riemann integration, and linear differential equations (part 2)

Linear algebra

- Vector spaces, subspaces, bases and dimension
- Linear Maps
- Matrices (part 1)

#### BIBLIOGRAPHY

J.-P. Ramis et al., Mathématiques Tout-en-un pour la Licence - Niveau L1, Dunod, 2e édition, 2013, ISBN-13: 978-2100598939

S. Balac et F. Sturm, Algèbre et analyse: Cours mathématiques de première années avec exercices corrigés, PPUR, 2e édition, 2009, ISBN-13: 978-2880748289 R. Godement, Cours d'algèbre, Hermann, 3e édition, 1997, ISBN-13: 978-2705652418

- R. Godement, Analyse mathématique I : Convergence, fonctions élémentaires, Springer,
- 2e édition, 2001, ISBN-13: 978-3540420576

J.M. Monier, Cours de mathématiques (algèbre : tomes 1 et 2; analyse : tomes 1 et 2) Dunod.

D. Guinin, B. Joppin, Les nouveaux précis de Mathématiques, Bréal.

## **PRE-REQUISITES**

High school calculus (Terminale STI2D or STL)







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## **IDENTIFICATION**

CODE : ECTS :	AVE0-1-S1-EC	-OMNI *
	HOURS	
Cours :		0h
TD :		35h
TP :		0h
Projet :		0h
Evaluation	:	0h
Face à face	e pédagogique :	35h
Travail pers	onnel :	35h
Total :		70h
ASSES	MENT METHO	D

Continuous assessment. TEACHING AIDS

Lecture notes and exercices textbook.

TEACHING LANGUAGE

French

CONTACT

M. Roggero Aurélien : aurelien.roggero@insa-lyon.fr

# AIMS

# CONTENT

Numerical calculus Trigonometry Complex numbers Geometry in the real plane Sums Polynomials

## BIBLIOGRAPHY

# **PRE-REQUISITES**

High school abilities.







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## IDENTIFICATION

CODE : AVE0-1-S1-EC-PF ECTS :	ROJET	
HOURS		
Cours :	9h	
TD :	46h	
TP :	Зh	
Projet :	52h	
Evaluation :	0h	
Face à face pédagogique :	58h	
Travail personnel :	110h	
Total :	220h	
ASSESMENT METHOD		

AIMS CONTENT BIBLIOGRAPHY PRE-REQUISITES

TEACHING AIDS

TEACHING LANGUAGE

CONTACT

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Domaine Scientifique de la DOUA 20 Avenue Albert Einstein - 69100 VILLEURBANNE

#### Company knowledge

#### **IDENTIFICATION**

CODE :	AVE0-1-S2-EC-CE
ECTS :	
	HOURS

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Cours :	0h
TD :	26h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	26h
Travail personnel :	20h
Total :	46h
ASSESMENT METHO	

 Documentary study DD-RS Individual written assessment, report, coefficient: 0.5 Hand in the report containing the

team's common elements and individual analyses by the date specified by the teacher. - Entrepreneur" project

Group oral assessment, defense, coefficient: 0.5

Hand in oral support and project sheets before class session 9, which is dedicated to oral presentations.

#### TEACHING AIDS

- Course materials for theoretical contributions

- Methodological frameworks
- Case studies and examples

- Supervision of project work and research

Additional resources for further study

Course materials are available on Moodle.

## TEACHING LANGUAGE

#### French

#### <u>CONTACT</u>

Mme PRIOT KARINE : karine.priot@insa-lyon.fr

## AIMS

#### **OBJECTIVES (AAV / APC) :**

At the end of the CE Business Knowledge module, students will be able to mobilize tools to analyze professional situations in terms of their economic, legal, managerial and ethical aspects. The learning context covers the operation of companies and other forms of organization (associations, NGOs, public bodies). Analyses are carried out according to a common theme: "VALUE CREATION".

Students will be able to : - analyze the organization and functioning of organizations, using numerous concrete

examples. mobilize a systemic, cross-disciplinary approach based on stakeholder analysis, drawing on theoretical foundations and strategic and operational tools from management and economics

gain perspective on the purposes of organizations, their role in the economic system, their capacity to act and the constraints they face.

identify the SD-RS and socio-economic transition issues raised by the way organizations operate.

- situate the engineer in organizations and project his/her role as a future engineer in these organizations.

carry out documentary research to deepen their knowledge independently.

- adapt tools and models to specific or novel situations.

- present their analyses in a well-argued manner, both orally and in writing. This knowledge can be applied and developed during the company discovery internship and in the department.

#### KEY COMPETENCIES TARGETED (TEACHING CHARTER - Humanities Department) 2. Work, learn, develop autonomy. 2.2 2.3 2.4

- 3. Interact with others and work on a team. 3.1 3.2 3.4
- 4. Develop creativity. 4.2 4.4
- 5. Act responsibly in a complex world. 5.1 5.2

## CONTENT

- 26 hours face-to-face + 20 hours personal work.
- CM: Course presentation & round-table discussions with lecturing engineers
- 3 sessions reserved for project follow-up, DD-RS study and case studies
- TD2: SD-RS and CSR, corporate responsibility
  TD3: Socio-ecological transition and new economic perspectives
- TD4: Markets and competition: how does it work?
- TD5: Strategic diagnostic tools for understanding the systemic environment
- TD6: Making strategic choices, building a business model
- TD7: Internal and legal organization from the company's point of view
- TD8: Work organization from the point of view of employees and engineers
- TD9: Final project presentations

#### BIBLIOGRAPHY

References are given during the course, in connection with the topics covered.

## PRE-REQUISITES

No specific prerequisites in management or economics are required. CE Connaissance de l'entreprise is a Humanities course. It links up with the ETRE and CSS (Culture, Sciences et Société) courses.







# Centre des Humanités

Domaine Scientifique de la DOUA 20 Avenue Albert Einstein - 69100 VILLEURBANNE

English in INSAVENIR (S2)

# IDENTIFICATION

## CODE : HU-0-S2-EC-L-ANG-AVE ECTS : -

HOURS

Cours :	0h
TD :	24h
TP :	0h
Projet :	0h
Evaluation :	0h
Face à face pédagogique :	24h
Travail personnel :	0h
Total :	24h
ASSESMENT METHO	D

Continuous assessment based on the defined learning outcomes

TEACHING AIDS

Teaching documents are chosen by the instructor according to the target level: -Various instructional and authentic English-language materials

-Audio-visual documents

#### TEACHING LANGUAGE

French

#### CONTACT

Mme Eliard Krystyna : krystyna.irvine@insa-lyon.fr Mme Tremouilhac Erin : erin.tremouilhac@insa-lyon.fr

# AIMS

To consolidate, acquire, and enrich linguistic knowledge and skills by developing the competences defined by the Common European Framework of Reference for Languages.

Students are divided into groups based on level, and specific linguistic objectives are determined according to the student's level.

#### CONTENT

In order to develop the defined learning outcomes, the course will employ language activities that are varied (written comprehension and expression, oral comprehension and expression, oral interaction) and complex (projects, simulations, etc.). The activities are designed to promote maximum language exposure and the use of the

target language as a vehicle of culture and as a tool for work and communication. The student will become more autonomous through group work and personal work.

#### **BIBLIOGRAPHY**

The Common European Framework of Reference for Languages, Council of Europe

#### **PRE-REQUISITES**

None







CODE :	AVE0-1-S2-	EC-PH
ECTS :		5
	HOURS	
Cours :		7h
TD :		31h
TP :		18h
Projet :		0h
Evaluation :		4h
Face à face	pédagogique :	60h
Travail perso	onnel :	60h
Total :		120h
ASSES		

Continuous assessment all along the school semester to check acquired knowledge and skills by tests and practical exams.

A final exam will be held at the end of the school semester to evaluate the ability to analyze and solve a problem using the knowledge and skills acquired during the whole year.

#### TEACHING AIDS

Textbooks with lecture notes, exercises and problems for tutorials and practicals wordings. Multiple-choice questionnaire for autonomous training and selfassessment are available (French only).

TEACHING LANGUAGE

#### French

CONTACT

M. Dalmas Florent : florent.dalmas@insa-lyon.fr

#### AIMS

Targeted learning outcomes (TLA) :

AAv.1 Make a circuit from a diagram and vice versa, and model a 1st order continuous or transient electrical circuit.

AAv.2 Determine currents, voltages and energy quantities in a 1st order continuous or transient circuit from the characteristics of the components.

AAv.3 Construct and use a graphical representation of electrical quantities.

AAv.4 Calculate the moments of forces with respect to a point or an axis and project forces onto axes to solve a statics problem and determine a position of equilibrium or the expression of a force, justifying the steps.

expression of a force, justifying the steps. AAv.5 Solve a kinematic problem to study a rectilinear, circular or any other kind of movement, using either a graph (to obtain information about the movement) or analytical expressions in the Cartesian, cylindrical or Frenet basis.

## CONTENT

Mechanics: statics (forces and moments of forces); kinematics (link between the position, trajectory, speed and acceleration of the object under study)
 Electrokinetics: alternative AC regime

## **BIBLIOGRAPHY**

All physics books written for first undergraduate cycle.

## **PRE-REQUISITES**

Notions learnt during secondary education: calculus, plane geometry, and trigonometric functions, calculation skills (derivatives, anti-derivatives, complex numbers, quadratic equations, systems of linear equations, trigonometry, vectors...), statistics (average and standard deviation), data and functions plots.

This teaching will also use the mathematical tools and skills that will be learnt all along the school year.





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CODE : ECTS :	AVE0-1-S2-	EC-CH 3
НС	OURS	
Cours :		0h
TD :		0h
TP :		37.5h
Projet :		0h
Evaluation :		2.5h
Face à face pé	dagogique :	40h
Travail personn	iel :	40h
Total :		80h
ASSESME	NT METHO	D

# AIMS CONTENT BIBLIOGRAPHY PRE-REQUISITES

# TEACHING AIDS

## TEACHING LANGUAGE

## French

## CONTACT

M. da Silva Pedro : pedro.da-silva@insa-lyon.fr M. Livi Sébastien : sebastien.livi@insa-lyon.fr Mme Kim Boram : boram.kim@insa-lyon.fr Mme Jacolot Maiwenn : maiwenn.jacolot@insa-lyon.fr M. Garnier Vincent : vincent.garnier@insa-lyon.fr







#### Domaine Scientifique de la DOUA 20 Avenue Albert Einstein - 69100 VILLEURBANNE

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## IDENTIFICATION

CODE : ECTS :	AVE0-1-S2-E0	C-OMNI *
	HOURS	
Cours :		6h
TD :		26h
TP :		6h
Projet :		0h
Evaluation :		2h
Face à face	pédagogique :	40h
Travail perse	onnel :	40h
Total :		80h
ASSES	MENT METH	OD

Continuous assessment.

TEACHING AIDS

Lecture notes and exercices textbook, specific content of lanes available on Moodle.

TEACHING LANGUAGE

French

CONTACT

M. Roggero Aurélien : aurelien.roggero@insa-lyon.fr

# AIMS

# CONTENT

Vectors Differential calculus Curves, surfaces, coordinate systems Second order linear differential equations with constant coefficients

## **BIBLIOGRAPHY**

## **PRE-REQUISITES**

High school abilities.







CODE : AVE0-1-S2-EC-MA		EC-MA
ECTS :		5
	HOURS	
Cours :		16h
TD :		31.25h
TP :		0h
Projet :		0h
Evaluation :		2.75h
Face à face pédagogique :		50h
Travail personnel :		50h
Total :		100h
ACCECI		

The evaluation includes weekly quizzes (coefficient 0.25 for all the period) 3 oral test (coefficient 0.25 each ), 3 written tests 2h (Coefficient 1 each ) and 1 final test 3h ( coefficient 1.5 ) and two little test 1h (coefficient 0.3), and 1 Matlab project (coefficient 0.3)

TEACHING AIDS

each student , in The Moodle web site (group 30) , can find a digital version of the analysis book, algebra exercises as well as QCM Training and the test ( + Subjects and correcteion) of the previous years.

TEACHING LANGUAGE

French

#### CONTACT

M. bouvier patrick : patrick.bouvier@insa-lyon.fr

#### AIMS

Most of the S2 is devoted to the study of the second part of linear algebra (matrice, determinant and reduction) . In analysis, S2 is devoted to the study of the concepts of continuity and differentiability as well as integral calculus.

The rest of the semester will be spent on more applied aspects with the study of linear differential equations, numerical sequences and some approximation methods.

- In this framework, students will deepen their ability to:
- C11 Break down a problem into a set of interacting sub-parts
- C14 Build a sketch adapted to a context
- C15 Identify issues or action objectives.
- C16 Build a proof.
- C25 Use algebraic and numerical computation techniques.
- C55 Make a synthesis of intermediate results in response to questioning.

C62 - Make a reasoned solution respecting a balance between everyday language and symbolic language.

This EC appears in the Unité d'Enseignement Sciences Pures.

It contributes to the following abilities in Engeneer School :

- C1 analyse a system or issue
- C2 Exploit a Real or Virtual system Model
- C6 Communicate an analysis, a scientific path, in an argued and ogical discussion
- C24 To implement scenarii to verify results coming from modelization
- C54 Results interpretation

C61 - To structure a speech associated to a logical and argued reasoning, aiming at clearly identified objectives

#### CONTENT

- Linear algebra :
- Matrices (part 2)
- Determinänt
- Reduction of Endomorphisms and Matrices

#### Analvsis

Numerical sequences: recursive sequences, fixed point theorem, Newton method. differential equations, convexity, comparison of functions, Taylor formulas. Hyperbolic functions, inverse functions

Riemann integration, and Linear differential equations (part 3)

He will especially deepen the concepts of continuity and differentiability as well as integral calculus.

#### **BIBLIOGRAPHY**

J.-P. Ramis et al., Mathématiques Tout-en-un pour la Licence - Niveau L1, Dunod, 2e

édition, 2013, ISBN-13:978-2100598939 S. Balac et F. Sturm, Algèbre et analyse: Cours mathématiques de première années avec exercices corrigés, PPUR, 2e édition, 2009, ISBN-13: 978-2880748289

R. Godement, Cours d'algèbre, Hermann, 3e édition, 1997, ISBN-13: 978-2705652418

R. Godement, Analyse mathématique : I Convergence, fonctions élémentaires, Springer, 2e édition, 2001, ISBN-13: 978-3540420576

J.M. Monier, Cours de mathématiques (algèbre : tomes 1 et 2; analyse : tomes 1 et 2) Dunod.

D. Guinin, B. Joppin, Les nouveaux précis de Mathématiques, Bréal.

#### PRE-REQUISITES

AVE0-S1







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## **IDENTIFICATION**

CODE : AVE0-1-S2-EC-PROJET ECTS :			
HOURS			
Cours :	13h		
TD :	27h		
TP :	8h		
Projet :	52h		
Evaluation :	0h		
Face à face pédagogique :	48h		
Travail personnel :	100h		
Total :	200h		
ASSESMENT METHOD			

AIMS CONTENT BIBLIOGRAPHY PRE-REQUISITES

# TEACHING AIDS

TEACHING LANGUAGE

CONTACT

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