3rd-year Courses and ECTS Credits at ENSAI

2019-2020

Advanced Statistical Engineering

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Machine Learning – Neural Networks	3	9		12	0
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***48***	***57***	***0***	***105***	***7***
UE2 - Modeling					
Nonlinear Modeling	12	6		18	1
Extreme Value Theory	16.5			16.5	1
Extreme Value Theory– advanced		6		6	0.5
Semiparametric Additive Models	6	6		12	1
Bayesian Statistics	9	6		15	1
Total	***43,5***	***24***	***0***	***67.5***	***4.5***
UE3 - Image Processing					
Markovian Models for Image Analysis	30			30	2
Image Analysis Project		15		15	1
Linear and Nonlinear Filtering	9	3		12	1
Total	***39***	***18***	***0***	***57***	***4***
UE4 - Stochastic Processes and Forecasting					
Statistics of Stochastic Processes	12			12	1
Statistics of Stochastic Processes — advanced	9	6		15	1
Geostatistics	15			15	1
Semiparametric Forecasting	12			12	1
Advanced Time Series	3	21		24	1
Total	***51***	***27***	***0***	***78***	***5***
UE5 - Quality and Reliability					
Experiment Design	18			18	1.5
Risk Management and Operation Safety	6			6	0
Reliability	21	6		27	2
Total	***45***	***6***	***0***	***51***	***3.5***
Final Year Projects					
Methodological project		3	9	12	1
End of study project		9	27	36	3
Data Challenge		12		12	0
Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0

TOTAL	**289.5**	**192**	**36**	**517.5**	**30**

Advanced Tools for Data Science & Machine Learning Data Scientist

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Machine Learning – Advanced Neural Networks	3	9		12	0
Machine Learning – Recommendation Systems	6	6		12	0
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine-Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***54***	***63***	***0***	***117***	***7***
UE2 - Application Development					
Software Engineering	39	39		78	4
Web Datamining	9	6		15	1
Web Applications	12	15	9	36	3
Total	***60***	***60***	***9***	***129***	***8***
UE3 - Big Data					
Semantic Technologies	6	9		15	1
NoSQL Technolgies	12	3		15	1
Privacy-preserving data publishing	15	6		21	1
Total	***33***	***18***	***0***	***51***	***3***
UE4 - Computer Systems and Networks					
Computer Networks and Operating Systems	15	6		21	2
Introduction to Unix	9	6		15	0
Networks	15	6		21	1
Data Security	9	6		15	1
Big Data and Cloud Computing	12	12		24	2
Total	***60***	***36***	***0***	***96***	***6***
Final Year Projects					
Methodological Research Project		3	9	12	1
End of Study Project		9	27	36	3
Data Challenge		12		12	0
Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0
Total	***30***	***0***	***0***	***30***	***0***
TOTAL	**270**	**237**	**45**	**552**	**30**

Biostatistics

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine-Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***45***	***48***	***0***	***93***	***7***
UE2 - Statistical Methodology 1					
Experiment Design	18			18	1
Mixed Models	15	9		24	1.5
Survival Analysis Applied to Biostatistics	18	6		24	1.5
Total	***51***	***15***	***0***	***66***	***4***
UE3 - Statistical Methodology 2					
Measuring Quality of Life	12	6		18	1
Statistics of Stochastic Processes	12			12	1
Statistics of Stochastic Processes - advanced		3		3	0
Handling of Missing Data in Clinical Trials	6	6		12	1
Advanced Bayesian Statistics	9	6		15	1
Meta Analysis	12	6		18	1
Total	***51***	***27***	***0***	***78***	***5***
UE4 - Clinical Trials					
Clinical Trials	18			18	1
Pharmacometrics	6	12		18	1
Project in Clinical Trials		6	18	24	2
Total	***24***	***18***	***18***	***60***	***4***
UE5 - Epidemiology					
Quantitative Epidemiology	18			18	1
Compartmental Modeling	6	6		12	1
Total	***24***	***6***	***0***	***30***	***2***
UE6 - Statistics for *Omics* Data					
Omics Data Analysis	6	12		18	1
Introduction to *Omics* Data Analysis	6	6		12	1
Total	***12***	***18***	***0***	***30***	***2***
Final Year Projects					
Methodological Research Project		3	9	12	1
End of Study Project		9	27	36	3
Data Challenge		12		12	0
Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0

Total	***30***	***0***	***0***	***30***	***0***
TOTAL	**270**	**192**	**54**	**516**	**30**

Data Modeling for Spatial Analysis and Health Economics

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine-Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***45***	***48***	***0***	***93***	***7***
UE2 - Territorial Dynamics					
Demography	12	6		18	1
Labor Dynamics	15			15	1
Public Economics	15			15	1
Econometrics of Program Evaluation	12	3		15	1
Total	***54***	***9***	***0***	***63***	***4***
UE3 - Health and Social Welfare					
Economics Modeling for Health	24			24	1
Valuing Health	18		3	21	1
Insurance	21			21	1
Health Economics	24		6	30	1
Total	***87***	***0***	***9***	***96***	***4***
UE4 - Advanced Econometrics					
Advanced Microeconometrics	18			18	1
Advanced Microeconometrics of Discrete Choices	31	3		24	1
Econometric Analysis of Panel Data	9	3		12	1
Econometric Analysis of Panel Data - advanced	12			12	0
Spatial Statistics and Econometrics	9	3		12	1
Spatial statistics and Econometrics – advanced	12			12	0
Advanced Bayesian Statistics	9	6		15	1
Total	***90***	***15***	***0***	***105***	***5***
UE5 - Elective					
Spatial Economics and Migrations	12	3		15	1
Urban Economics	15			15	1
Energy Policy and Economy	15			15	1
Analysis of Social, Spatial, and Complex Networks	18	9		27	2
Industrial Organization: Competition and Market Strategies	15			15	1
Meta Analysis	12	6		18	1
Economic Evaluation in Health Care	12	12	6	30	2
Total	***99***	***30***	***6***	***135***	***4***
Final Year Projects					
Methodological Research Project		3	9	12	1
End of Study Project		9	27	36	3
Data Challenge		12		12	0

Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0
Total	***30***	***0***	***0***	***30***	***0***
TOTAL	**438**	**162**	**51**	**651**	**30**

Quantitative Marketing and Revenue Management

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Machine Learning – Recommendation systems	6	6		12	0
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine-Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***51***	***54***	***0***	***105***	***7***
UE2 - Marketing Culture					
Market.Pro Challenge		22.5		22.5	1
Customer Relationship Management	12			12	1
Introduction to Marketing	12			12	1
Experiential Marketing	12			12	0
Digital Marketing	6			6	0
Scoring Methods	6	18	18	42	3
Total	***48***	***40.5***	***18***	***106.5***	***6***
UE3 - Pricing and Revenue Management					
Introduction to Revenue Management	12			12	1
In-depth Revenue Management Models	12			12	0
Pricing	12			12	1
Dynamic and Linear Optimization	36			36	2
Stochastic Optimization	18			18	1
Total	***90***	***0***	***0***	***90***	***5***
UE4 - Advanced Statistic and Econometrics					
Econometric Analysis of Panel Data	9	6		15	1
Structural Equations Modeling	15	9		24	2
Bayesian Regression	12			12	1
Advanced Microeconometrics of Discrete Choices	9	3		12	1
Spatial Statistics and Econometrics	9	3		12	1
Total	***54***	***21***	***0***	***75***	***6***
Final Year Projects					
Methodological Research Project		3	9	12	1
End of Study Project		9	27	36	3
Data Challenge		12		12	0
Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0

Total	***30***	***0***	***0***	***30***	***0***
TOTAL	**306**	**175.5**	**54**	**535.5**	**30**

Risk Management and Financial Engineering

	Class	Workshop	Project	Total Hours	ECTS Credits
UE0 - Common Courses					
Work Law	3	6		9	0.5
English	30			30	1.5
Sport (optional)		*30*		*30*	*0*
Total	***33***	***36***	***0***	***69***	***2***
UE1 - Machine Learning					
Machine Learning	18	21		39	3
Penalized Problems and Model Selection	9	6		15	1
Large-scale Machine Learning	9	9		18	1.5
Webmining & NLP	9	12		21	1.5
Total	***45***	***48***	***0***	***93***	***7***
UE2 - Risk Management 1					
Banking Risk Management	24			24	1.5
Scoring Techniques and Methods	12	18	6	36	2
Asset Liquidity Management	12	6		18	1
Total	***48***	***24***	***6***	***78***	***4.5***
UE3 - Risk Management 2					
Extreme Value Theory	16.5			16.5	1
Statistics of Extreme Risks	6	12	3	21	1
Copula Theory	9			9	0.5
Statistics of Multiple Risks	3	6	3	12	0.75
Financial Econometrics	12			12	0.75
Advanced Time Series	3	21		24	1
Total	***49.5***	***39***	***6***	***94.5***	***5***
UE4 - Financial Engineering					
Quantitative Strategies and Statistics of Hedge Funds	15	15	6	36	2
Socially Responsible Investment	3	15		18	1
Asset Pricing Theory and Portfolio Management	9	9		18	1
Total	***27***	***39***	***6***	***72***	***4***
UE5 - Quant Culture					
Stochastic Calculus	18	12		30	1.75
Calibration of Stochastic Processes	15	15		30	0.75
Yield Curves Models	6	18	6	30	1
Total	***39***	***45***	***6***	***90***	***3.5***
Final Year Projects					
Methodological Research Project		3	9	12	1
End of Study Project		9	27	36	3
Data Challenge		12		12	0

Total	***0***	***24***	***36***	***60***	***4***
Professional Seminar					
Professional Seminar	30			30	0
Total	***30***	***0***	***0***	***30***	***0***
TOTAL	**271.5**	**255**	**60**	**586.5**	**30**