

Annex 1

Sapienza courses recognized by ENSAI for admission to Master Science des données pour la décision publique	Total ECTS credits	ENSAI courses recognized by Sapienza for admission to Master in Statistical Methods and Applications(SMA) – EMOS	Total ECTS credits
First year		First Year	
<p>Stochastic Processes (9 ECTS) Sample Survey (9 ECTS) Applied Econometrics (6 ECTS) Data Cleaning and Integration in Official Statistics (6 ECTS) Data Quality and Other Topics in Official Statistics (6 ECTS) Laboratory of Financial and Monetary Statistics (3 ECTS)</p> <p>1 Elective of 9 ECTS</p> <ul style="list-style-type: none"> • Advances in Data Analysis and Statistical Modeling • Computational Statistics • Probability and Statistics <p>1 Elective of 6 ECTS</p> <ul style="list-style-type: none"> • Bayesian Modeling , or • The role of International Organization in producing Official Statistics <p>1 Elective of 6 ECTS</p> <ul style="list-style-type: none"> • Algorithms and Data Structures • Big Data for Official Statistics 	60	<p>Introduction to Statistical Modeling (9ECTS) Collection and Learning (6 ECTS) IT for Data Science (6 ECTS) Economic Modeling (5 ECTS) Humanities & Internship (4 ECTS) Statistics Project (5 ECTS) Intermediate Statistical Modeling (6 ECTS) Computational Methods (8 ECTS) 3 Electives (8 ECTS) Humanities & Communication (3 ECTS)</p> <p><i>Electives (2 ECTS each):</i></p> <ul style="list-style-type: none"> • <i>Signal Processing</i> • <i>Software Design</i> • <i>Data Challenge</i> • <i>Data Visualization</i> • <i>Advanced Programming with R</i> • <i>Industrial Economics</i> • <i>Risk Economics</i> • <i>Demography</i> • <i>Digital Economics</i> • <i>Martingales & Lévy Process</i> • <i>Advanced Regression Models</i> • <i>Bootstrap</i> • <i>Time Series 2</i> • <i>Mathematical Statistics</i> • <i>Spatial Statistics</i> 	60

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Sapienza courses recognized by ENSAI for admission to Master for Smart Data Science	Total ECTS credits	ENSAI courses recognized by Sapienza for admission to Master in Statistical Methods and Applications(SMA) – DA Track	Total ECTS credits
First year		First Year	
<p>Stochastic Processes (9 ECTS) Sample Survey (9 ECTS) Applied Econometrics (6 ECTS)</p> <p>Choice of (18 ECTS)</p> <ul style="list-style-type: none"> • Bayesian Modeling • Probability and Statistics • Advances in data analysis and statistical modelling <p>Electives (12 ECTS)</p> <ul style="list-style-type: none"> • Algorithms and Data Structures (6 ECTS) • Statistical Learning (6 ECTS) • Data Driven Decision Making (6 ECTS) <p>Electives (6 ECTS)</p> <ul style="list-style-type: none"> • Laboratory of Stochastic Processes (3 ECTS) • Complementary Activities (3 ECTS) • Complementary Activities (6 ECTS) • Laboratory of Financial and Monetary Statistics (3 ECTS) • Laboratory of Machine Learning (3 ECTS) 	60	<p>Introduction to Statistical Modeling (9ECTS) Collection and Learning (6 ECTS) IT for Data Science (6 ECTS) Economic Modeling (5 ECTS) Humanities & Internship (4 ECTS) Statistics Project (5 ECTS) Intermediate Statistical Modeling (6 ECTS) Computational Methods (8 ECTS) 3 Electives (8 ECTS) Humanities & Communication (3 ECTS)</p> <p><i>Electives (2 ECTS each):</i></p> <ul style="list-style-type: none"> • <i>Signal Processing</i> • <i>Software Design</i> • <i>Data Challenge</i> • <i>Data Visualization</i> • <i>Advanced Programming with R</i> • <i>Industrial Economics</i> • <i>Risk Economics</i> • <i>Demography</i> • <i>Digital Economics</i> • <i>Martingales & Lévy Process</i> • <i>Advanced Regression Models</i> • <i>Bootstrap</i> • <i>Time Series 2</i> • <i>Mathematical Statistics</i> • <i>Spatial Statistics</i> 	60

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Sapienza courses recognized by ENSAI for admission to Master Science des données pour la décision publique	Total ECTS credits	ENSAI courses recognized by Sapienza for admission to Master in Statistical Methods and Applications(SMA) – QE Track	Total ECTS credits
First year		First Year	
<p>Stochastic Processes (9 ECTS) Efficiency and productivity analysis (9 ECTS) Sample Surveys (9 ECTS) Applied Econometrics (6 ECTS)</p> <p>Elective of 9 ECTS Advances in Data Analysis and Statistical Modeling (9 ECTS) Probability and Statistics (9 ECTS)</p> <p>Elective of 15 ECTS</p> <ul style="list-style-type: none"> ● Computational Statistics 9 ECTS ● Statistical Learning (6 ECTS) ● Algorithms and data structures (6 ECTS) ● International monetary economics (9 ECTS) ● Economic history (9 ECTS) <p>Elective of 3 ECTS</p> <ul style="list-style-type: none"> ● Laboratory of stochastic processes (3 ECTS) ● Laboratory of financial and monetary statistics (3 ECTS) ● Laboratory of machine learning (3 ECTS) ● Case studies and statistical consulting (3 ECTS) ● Reading seminars (3 ECTS) ● Complementary activities (3 ECTS) 	60	<p>Introduction to Statistical Modeling (9ECTS) Collection and Learning (6 ECTS) IT for Data Science (6 ECTS) Economic Modeling (5 ECTS) Humanities & Internship (4 ECTS) Statistics Project (5 ECTS) Intermediate Statistical Modeling (6 ECTS) Computational Methods (8 ECTS) 3 Electives (8 ECTS) Humanities & Communication (3 ECTS)</p> <p><i>Electives (2 ECTS each):</i></p> <ul style="list-style-type: none"> ● <i>Signal Processing</i> ● <i>Software Design</i> ● <i>Data Challenge</i> ● <i>Data Visualization</i> ● <i>Advanced Programming with R</i> ● <i>Industrial Economics</i> ● <i>Risk Economics</i> ● <i>Demography</i> ● <i>Digital Economics</i> ● <i>Martingales & Lévy Process</i> ● <i>Advanced Regression Models</i> ● <i>Bootstrap</i> ● <i>Time Series 2</i> ● <i>Mathematical Statistics</i> ● <i>Spatial Statistics</i> 	60

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<p>Courses recognized by ENSAI for Master <i>Science des données pour la décision publique</i> students pursuing Master in Statistical Methods and Applications(SMA)</p>	<p>Total ECTS credits</p>	<p>Courses recognized by Sapienza for Master in Statistical Methods and Applications(SMA) – EMOS-OS students pursuing Master <i>Science des données pour la décision publique</i> at ENSAI</p>	<p>Total ECTS credits</p>
<p>Second Year</p>		<p>Second Year</p>	
<p>Required courses QE Track at Sapienza</p> <p>Multiple time series modeling (6 ECTS)</p> <p>Elective of 21 ECTS</p> <ul style="list-style-type: none"> ● Empirical economics (9 ECTS) ● International monetary economics (9 ECTS) ● Advances in data analysis and statistical modelling (9 ECTS) ● Bayesian Modelling (9 ECTS) ● Computational Statistics (9 ECTS) ● Statistical learning (6 ECTS) ● Development Finance (6 ECTS) ● Big Data Analytics (6 ECTS) <p>Elective of 3 ECTS</p> <ul style="list-style-type: none"> ● Laboratory of data driven decision making (3 ECTS) ● Laboratory of financial and monetary statistics (3 ECTS) ● Laboratory of machine learning (3 ECTS) ● Case studies and statistical consulting (3 ECTS) ● Reading seminars (3 ECTS) ● Complementary activities (3 ECTS) <p>Elective of 9 ECTS (selected by the student among Sapienza list)</p> <p>Master's Thesis (21 ECTS)</p> <hr style="border-top: 1px dashed black;"/> <p>Required courses EMOS-OS Track at Sapienza</p> <p>Spatial Statistics and Statistical Tools for Environmental Data (9 ECTS)</p> <p>Internship (9 ECTS)</p> <p>Elective of 9 ECTS (selected by the student among Sapienza list)</p> <p>Electives Of 3 ECTS:</p> <ul style="list-style-type: none"> ● Case Studies and Statistical Consulting (3 ECTS) ● Other Educational Activities (3 ECTS) ● Laboratory of Stochastic Processes (3 ECTS) ● Laboratory of Machine Learning (3 ECTS) 	<p style="text-align: center;">60</p>	<p>Required courses for Statistical Studies (ES) track:</p> <p>Block 1 - Machine Learning (5 ECTS) Block 2 - Survey Design & New Sources of Data (4 ECTS) Block 3 - Public Decision Making (4 ECTS) Block 4 - Advanced Econometrics (4 ECTS) Block 5 - Elective (3 ECTS) Block 6 - Elective (3 ECTS) Block 7 - Projects (4 ECTS) Block 8 - EMOS (3 ECTS) Block 9 - Internship & Thesis (30 ECTS)</p> <p style="text-align: center;"><i>Block 5 Electives: Conjuncture Analysis (UR1) or Public Policy & Economic Transitions (UR1)</i></p> <p style="text-align: center;"><i>Block 6 Electives: Conjuncture Analysis (UR1) or Public Policy & Economic Transitions (UR1) or Time Series Analysis & Advanced Time Series or Advanced Learning (Clustering & Dimension Reduction, PLS Regression & PLS Logistic Regression) or Spatial Statistics & Predictions (Spatial Analysis & Multivariate Prediction Models)</i></p> <p>Required courses for Official Statistics Methodology (MSP) track:</p> <p>Block 1 - Machine Learning (5 ECTS) Block 2 - Survey Design & New Sources of Data (4 ECTS) Block 3 - Public Decision Making (4 ECTS) Block 4 - Advanced Data Collection (4 ECTS) Block 5 - Elective (3 ECTS) Block 6 - Elective (3 ECTS) Block 7 - Projects (4 ECTS) Block 8 - EMOS (3 ECTS) Block 9 - Internship & Thesis (30 ECTS)</p> <p style="text-align: center;"><i>Block 5 Electives: Time Series Analysis & Advanced Time Series or Advanced Learning (Clustering & Dimension Reduction, PLS Regression & PLS Logistic Regression) or Spatial Statistics & Predictions (Spatial Analysis & Multivariate Prediction Models)</i></p>	<p style="text-align: center;">60</p>

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<p>Master's Thesis (30 ECTS)</p>		<p><i>Block 6 Electives: Conjuncture Analysis (UR1) or Public Policy & Economic Transitions (UR1) or Advanced Econometrics or Time Series Analysis & Advanced Time Series or Advanced Learning (Clustering & Dimension Reduction, PLS Regression & PLS Logistic Regression) or Spatial Statistics & Predictions (Spatial Analysis & Multivariate Prediction Models)</i></p> <p>Required courses for International English-taught EMOS Economics track: Block 1 - Machine Learning (5 ECTS) Block 2 - Economic Modeling (4 ECTS) Block 3 - Health & Social Protection (3 ECTS) Block 4 - Advanced Econometrics (5 ECTS) Block 5 - Network Analysis (4 ECTS) Block 6 - Projects (6 ECTS) Block 8 - EMOS (3 ECTS) Block 9 - Internship & Thesis (30 ECTS)</p>	
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Courses recognized by ENSAI for <i>Ingénieur Statisticien</i> students pursuing Master in Statistical Methods and Applications(SMA) – DA Track at Sapienza	Total ECTS credits	Courses recognized by Sapienza for Master in Statistical Methods and Applications(SMA) – DA Track students pursuing Master for Smart Data Science at ENSAI	Total ECTS credits
Second Year		Second Year	
<p>Spatial Statistics and Statistical Tools for Environmental Data (9 ECTS)</p> <p>Elective of 12 ECTS</p> <ul style="list-style-type: none"> ● Statistical learning (6 ECTS) ● Computational Statistics (6 ECTS) ● Multiple Time Series (6 ECTS) ● Big data analytics (6 ECTS) ● Data driven decision making (6 ECTS) <p>Elective of 6 ECTS</p> <ul style="list-style-type: none"> ● Laboratory of machine learning (3 ECTS) ● Other Educational Activities (3 ECTS) ● Laboratory of data driven decision making (3 ECTS) ● Laboratory of machine learning (3 ECT <p>Elective of 12 ECTS (selected by the student among Sapienza list)</p> <p>Master’s Thesis (21 ECTS)</p>	60	<p>Block 1 - Machine Learning (7 ECTS)</p> <p>Block 2 - Models for Dependent Data (5 ECTS)</p> <p>Block 3 - Statistics for New Data (5 ECTS)</p> <p>Block 4 - Advanced Tools for Data Analysis & Computing (3 ECTS)</p> <p>Block 5 - IT Tools (5 ECTS)</p> <p>Block 6 - Case Studies & Project (5 ECTS)</p> <p>Block 7 - Internship & Master’s Thesis (30 ECTS)</p>	60