

**Planning document for the PhD course in 'Systems Dynamics'.
XXXIX Coort
University of Palermo
(Reference AVA 3 D.PHD.1)**

Brief description of the considerations and steps that led to the establishment of the Doctoral Course

The doctoral course in 'Systems Dynamics' represents the evolution of the doctoral programme in 'Model Based Public Planning, Policy Design & Management' - corresponding to the current ' Model Based Public Planning, Policy Design and Management' curriculum - originally first accredited in 2007 and subsequently enriched by the double-degree collaboration with the Tadeo Lozano University in Bogotá.

The academic collaboration with the University of Bergen - with which Prof. Carmine Bianchi, the initial coordinator of the PhD Course, has maintained a fruitful relationship since 1994 - and subsequently with the University of Nijmegen (Netherlands) formed the basis for the innovative idea underlying the PhD Course: to "blend" system dynamics with the methodologies of quantitative determination of management results in a forecasting perspective and concurrent and final control, adopted in academia and in the practice of public and private enterprises.

This systemic methodology supports a more robust co-ordination between public institutions and decision-makers and among them and the private institutions (e.g. companies, sporting bodies, non-profit associations, households) through the formulation and implementation of policies derived from a shared vision of the causal structure underlying the problems to be addressed. This coordination also implies the search for a greater capacity to implement public policies and assess their impact. It is, therefore, a coordination understood in both a 'vertical' and 'horizontal' sense, aimed at overcoming distortive barriers of a different nature (political, administrative, regulatory, language, cultural, professional).

On these cultural and methodological foundations, the first curriculum of the PhD programme - now called 'Model Based Public Planning, Policy Design and Management' - was launched. Its aim is to apply the methodology described above to foster a learning-oriented approach to public sector performance management and governance, for the design and implementation of sustainable policies.

The introduction of a second curriculum - called 'Legal Systems Dynamics' - came from the idea, widely spread in non-fiction writing worldwide, of analysing and studying legal flows, i.e. the circulation of legal and social models.

It is well-known that the construction of legislation is based on logic, at least following the so-called Western Legal Tradition. However, "interpretative emotion intervenes on the strict legal logic, individual experience insinuates itself into the reading of the normative logic, so that if the 'method' is comfortable in daily repetition, it is "perception that gives us the right solution" (Brian) and allows us to grasp the thin differences by making sense of the concepts of human responsibility and freedom of action.

It can thus be seen that the legal system does not represent what is actually the reality of other social systems, but what is perceived and, in acting on it, creates the actuality of interaction (Heisemberg). Thus, we speak of open systems and their interaction according to rules of extended general theory. Closed systems present devices based on general principles deriving from logic of the retroactive type, in the internal dynamics of the system there is a dynamic interaction of processes in the

realisation of order, the difficulty lies not so much in the regulation of the individual system, but in the understanding of system dynamics. If we add to this the problems stemming from the management of emotions, as a further model of adaptability, the picture becomes more complicated; finding the laws that regulate the different levels of social organisation and intervening on them then becomes extremely complex, considering that the regulatory system is in itself a complex and open system, which must intervene on the dynamics of processes between social systems.

Moreover, starting from the current XXXIX cohort, the PhD programme has been enriched with a third curriculum, 'Dynamics of Historical, Economic and Social Systems', specifically focused on the study of the theory of the circulation of historical, economic and social systems (including political aspects), assessing whether it is possible to use the techniques of systems dynamics. Consequently, the "Social Science Path" curriculum has been renamed 'Legal Systems Dynamics'.

From September 2022, the course has been enriched by the collaboration with the University of Baltimore (USA), in particular thanks to the relationship with the Dean of the College of Public Affairs Roger Hartley, at which some doctoral students can carry out part of their thesis, experimenting the Dynamic Performance Governance approach in a comparative key with Palermo, and in the practice field in some Baltimore neighbourhoods, in collaboration with the Baltimore Neighbourhood Indicators Alliance.

Over the years, numerous doctoral and post-doctoral students have carried out field research activities and/or other forms of institutionalised collaboration, thanks to the significant and constant relations with prestigious international universities and research organisations, such as the School of Government of the University of North Carolina at Chapel Hill and the University of Pittsburgh (USA).

Reference AVA 3: D.PHD. 1.1

The PhD programme in 'Systems Dynamics' is based on an integrated multidisciplinary approach. This approach aims to develop research-intervention skills that enable the student to acquire a "key to understanding" the relationships between the phenomenal dynamics observed in different social systems and the underlying causal structures.

This 'key to understanding' is centred on the use of a methodology called 'system dynamics'. This methodology enables the student to acquire analysis-diagnosis skills that lend themselves to supporting the processes of communication, learning, alignment and improvement of mental models and the adoption of regulatory systems, rules and decision-making tools, such as to lead to the formulation of 'sustainable' policies, in time and space. That is, such as to not only improve outcomes in the short term but also in the long term; and also such as to make problem solving compatible with outcomes in related problem areas.

The strategic learning process is the key through which the 'systems dynamics' approach offers the concrete advantage for an evolution of knowledge and application practices in an interdisciplinary perspective and, within the framework of the PhD Course, has been articulated in three distinct curricula:

- Model Based Public Planning, Policy Design and Management
- Dynamics of Legal Systems
- Dynamics of Historical, Economic and Social Systems

The curriculum "Model Based Public Planning, Policy Design and Management" focuses on the application of the System Dynamics methodology to foster a learning-oriented approach to public

sector performance management and governance for the design and implementation of sustainable policies.

The programme is fully held in English.

By attending the programme, PhD students will learn how modelling the dynamics of a complex system (e.g. corporate, inter-company, etc.) can support collaborative governance to manage 'wicked' social issues and to pursue sustainable community outcomes.

"Wicked" social issues characterise most governmental planning, with a specific concern for social issues. They are complex policy problems characterised by high risk and uncertainty and high interdependence between the variables affecting them. These problems cannot be grouped within the boundaries of a single organisation, or referred to specific administrative levels or ministerial areas. They are characterised by dynamic complexity, involving multi-level, multi-actor and multi-sectoral challenges.

Examples of such problems include traffic congestion, an ageing society, unemployment, youth disengagement, education, social cohesion, domestic violence, child abuse, crime, corruption, terrorism, poverty, refugee migration, homelessness, climate change and natural disasters.

The main aim of the 'Dynamics of Legal Systems' curriculum is to seek a new explanation for the theory of the movement of legal systems by assessing whether it is possible to use the techniques of systems dynamics.

Systems dynamics is an approach to understanding the behaviour of complex systems over time. It has to do with feedback loops and delays that affect the behaviour of the whole system. The basis of the method is the recognition that the structure of each system is often as important in determining its behaviour as the individual components themselves. The analysis of the dynamics in the circulation of models should lead us to the realisation of explanatory flow diagrams of the circulation itself and of the success of a given model rather than another even beyond the obsolete explanations about the 'prestige' or alleged 'economic efficiency' of the model itself.

At the same time, it will be a way to validate classifications and taxonomies in general, the theory of formants, the circulation of legal flows, the transplantation of systems also in the light of the exportation of legal models in legal development cooperation programmes, and also to reconstruct, both at a macro-comparative and micro-comparative level, the evolution of the main contemporary legal and social systems in the light of the principles of Systematics.

The main aim of the 'Dynamics of Historical, Economic and Social Systems' curriculum is to seek a new explanation for the circulation theory of historical, economic and social systems (including their political aspects) by examining whether it is possible to use the techniques of systems dynamics. The basis of the method is the recognition that the structure of any system is often as important in determining its behaviour as the individual components themselves. The analysis of the dynamics in the circulation of models should lead us to the realisation of explanatory flow diagrams of the circulation itself and of the success of a given model rather than another, even beyond the obsolete explanations concerning the 'prestige' or alleged 'economic efficiency' of the model itself.

In particular, we aim to deepen the study of the dynamics and socio-economic varieties of capitalism from a historical perspective, also through the use of case studies and international comparisons.

Examples of possible research projects concern: the varieties of capitalism; welfare and labour market systems; the theory of economic growth; national and international economic institutions; the processes of market integration and globalisation.

Furthermore, the aim is to train researchers capable of analysing processes of change on the basis of a close integration between sociological theories and empirical research, acquiring both a theoretical-conceptual background and a mastery of the main methodologies and techniques of social research, both standard and non-standard.

The proposed PhD programme, depending on the curricula into which it is divided, is mainly oriented towards the training of experts who can:

- start an academic career at qualified national and international Universities and Research Centres, and propose themselves for participation in working groups - so-called 'think tanks';
- start a career in Public Administrations, both Italian and non-Italian, such as: Municipalities, Provinces, Regions, Public Service Providers, etc;

- support, as a consultant, decision-makers in public administrations in analysing and assessing the quality and sustainability of the reorganisation and development policies and strategies to be adopted;
- working in public administration (e.g. state and local government, public services, health organisations);
- working in NGOs, non-profit, business, backbone and community-based organisations;
- working as an executive, cadre or manager in the public and private sector with broad international expertise in assessing the quality and sustainability of company policies and strategies and in putting them into practice;
- work as a manager in international trade and business;
- work as a manager or official in international and European organisations.
- The PhD programme will also enable students to work in support of and/or within Banks and other financial intermediation companies, to develop skills and capabilities.

It is also intended to provide for the establishment of the PhD alumni association, in order to enhance the identity and spirit of belonging of the PhDs in Systems Dynamics, creating a network of people and expertise to promote opportunities to meet and compare notes.

Reference AVA 3: D.PHD. 1.2

The Doctoral Course Board has formally defined a vision of the training objectives, also in relation to the available financial and human resources, the results of which have been published on the web pages dedicated to the Doctoral Course.

The vision drawn up by the Board takes into account the training objectives and the development and updating potential of the training and research project of the PhD course, as highlighted above (D.PH.1.1), with reference to the cultural and scientific evolution of the various reference areas.

A central aspect of this training course is the interdisciplinary, multidisciplinary and transdisciplinary nature of the process of studying, analysing and learning system dynamics. The multiplicity of areas of knowledge involved, therefore, has justified the creation of three different curricula - more adherent to the individual areas of knowledge involved from time to time - but still closely interconnected, both in the training pathway (through common training activities), and in the sharing of results and/or the possible activation of shared research initiatives.

In this regard, the Doctoral Board has positively assessed the possibility of activating - from year to year - interdisciplinary (and possibly also inter-curricular) research "clusters" with the aim of achieving innovative scientific results.

Reference AVA 3: D.PHD. 1.3

The training activities (both group and individual) proposed to doctoral students are consistent with the training objectives of the doctoral programme and with the outgoing cultural and professional profiles. The PhD students' training activities are balanced between highly specific topics related to the research project and more general aspects aimed at filling training gaps with multidisciplinary, transdisciplinary and interdisciplinary elements.

The training programme also includes in-depth linguistic activities and training aimed at the dissemination/communication of the research activity.

The planned teaching activity - intended for students in the first two years of the course - consists of at least 20 hours of face-to-face teaching for each curriculum. These teaching activities differ from those offered to students on three-year and master's degree courses, in terms of content and innovative teaching and research methodologies.

More specifically, the following planned teaching activities are envisaged for the 'Model Based Public Planning, Policy Design and Management' curriculum:

- *Dynamic Performance Management* (140 hours - first/second year):

The course aims at learning the basic principles of the Dynamic Performance Management method. The course is an integral part of the PhD programme with reference to the curriculum "Model Based Public Planning, Policy Design and Management". The course is fully held in English.

- *Dynamic Performance Management for Public Sector Organizations (100 hours - first/second year):
The course aims at learning and applying the Dynamic Performance Management method to public enterprises. The course is an integral part of the PhD programme with reference to the curriculum 'Model Based Public Planning, Policy Design and Management'. The course is fully held in English.*
- *Dynamic Performance Governance (150 hours - first/second year):
The course aims at learning the principles and techniques of implementing Dynamic Performance Governance. The course is an integral part of the PhD programme with reference to the curriculum "Model Based Public Planning, Policy Design and Management". The course is fully held in English.*
- *Fundamentals of Dynamic Social Systems (100 hours – first year):
The course aims at learning the basic principles of System Dynamics methodology. The course is an integral part of the PhD programme with reference to the curriculum "Model Based Public Planning, Policy Design and Management". The course is fully held in English.*
- *Model-based Analysis and Policy Design (100 hours – first year):
The course aims at learning quantitative modelling to simulate scenarios for public policy analysis. The course is an integral part of the PhD programme with reference to the curriculum 'Model Based Public Planning, Policy Design and Management'. The course is fully held in English.*
- *System Dynamics Modelling Process (100 hours – first year):
The course aims at learning the advanced techniques of qualitative-quantitative modelling through the support of System Dynamics methodology. The course is an integral part of the PhD programme with reference to the 'Model Based Public Planning, Policy Design and Management' curriculum. The course is fully held in English.*

The following scheduled teaching activities are planned for the 'Dynamics of Legal Systems' curriculum:

- *General Theory of Systems (20 hours – first year):
The course aims to enable the student to acquire the basics of the systems dynamics method and in particular the capacity for analysis-diagnosis that lends itself to support the processes of communication, learning, alignment and improvement of mental models and the adoption of regulatory systems, rules and decision-making tools that lead to the formulation of 'sustainable' policies, in time and space. The course is fully held in English.*
- *Legal-social systemology (20 hours – first year):
The course aims at acquiring a mastery of the fundamentals of systemology and its applications to the phenomena of production and management of social realities and the regulatory aspects functional to them. The course is fully held in English.*
- *Methodology of legal-social comparison (20 hours - first/second year):
The course aims to provide students with a full mastery of the method of comparison applied to legal and social phenomena, in conjunction with the method of systems dynamics, the circulation of models also through the study of their hybridisation. The course is fully held in English.*

The following scheduled teaching activities are planned for the 'Dynamics of Historical, Economic and Social Systems' curriculum:

- *Contemporary economic issues in historical perspective* (30 hours – first year):
The course covers topics relevant to the understanding of contemporary economic scenarios, using a historical-economic perspective. The main topics concern: 1. the functioning of national and international institutions, with a special focus on central banks; 2. the main changes taking place in the definition of economic and monetary policy strategies and instruments; 3. the analysis of the causes of the growing inequalities between and within countries and the debate on economic policy interventions to face this emergency. The aim of the course is to provide doctoral students in the socio-economic-historical curriculum with the appropriate tools to develop innovative research projects on the analysis of the systemic determinants that condition the performance of the international economy.
- *The legacy of Keynes and Schumpeter; the history of welfare states and the varieties of capitalism* (12 hours – first year):
The course consists of a series of seminars devoted to some major issues in the economic history of the 20th century that are useful for strengthening the understanding of contemporary economic scenarios. The main topics are: 1. Public intervention under conditions of uncertainty: the relevance of Keynes; 2. Endogenous growth and innovations: the relevance of Schumpeter; 3. The variety of capitalism in historical perspective: models of public intervention and economic growth; 4. Welfare and growth: lessons from the history of the 20th century. The aim of the series of seminars is to provide doctoral students in the socio-economic-historical curriculum with the appropriate tools to develop innovative research projects on the analysis of the systemic determinants that condition the performance of the international economy.

The doctoral programme also provides, on an year-by-year planning basis:

- *Seminars*
Meetings with Italian and foreign scholars for the in-depth study of doctoral topics, with particular reference to the theory of systems dynamics, methodology and systemology of political-legal-social models, as well as to the issues of the comparison and circulation of these models. The seminars favour an interdisciplinary approach to systems dynamics through the participation of scholars from different cultural and disciplinary backgrounds.
- *Language advanced courses*
Language advanced courses for students requiring English language support, with particular reference to contextual vocabulary and technical terminology. In particular, the courses, which make use of the facilities available at the university, aim to provide interested students with the necessary tools for attendance and research activities.

Moreover, doctoral students are constantly invited to participate in seminars, conferences and national and international conventions as speakers and/or discussants; they are also encouraged to publish their contributions to these seminar activities and the preliminary results of their research activities, giving preference to journals accredited in band "A" and contributions to collective works promoted by scholars of the various areas of national and international renown, favouring - where possible - the dissemination of research products in line with the open access policy promoted by the University.

PhD students must carry out academic activities - which include scheduled teaching activities, seminar and workshop activities, research and publication of research results, as well as supplementary teaching activities (up to 40 hours per year) - for the achievement of 60 CFU per year, for a total of 180 CFU over the three-year period.
CFUs will be awarded on the basis of the Credit Allocation Table in Annex 1.

It should be noted that the selection procedures for PhD students specified in the Announcements of Admission are consistent with the educational objectives of the PhD Course and with the outgoing cultural and professional profiles.

A further commitment is to implement orientation activities aimed at final-year students of Master's degree courses in order to encourage their participation in the PhD admission notices.

Reference AVA 3: D.PHD. 1.4

One of the most relevant specificities of the training project in Systems Dynamics is the interdisciplinary, multidisciplinary and transdisciplinary nature of the process of studying, analysing and learning *system dynamics*.

Moreover, running through the different curricula is the objective of training scholars capable of responding to systemic and 'global' problems; problems that do not lend themselves to a sectoral, mono-disciplinary and static approach.

Among these problems, a special role is occupied by what the literature has defined as 'wicked problems', i.e. those issues multifaceted in time and space that - especially today - pose unprecedented challenges to society and its institutions. For example: regulating migration flows, terrorism, globalisation of markets, an ageing population, crime prevention and control, improving the quality of life in metropolitan urban areas and suburbs, health and sport, pollution, natural disasters, social marginalisation. Especially in the last decade, the dynamics generated by this 'family' of problems have demonstrated the unpredictability of the phenomena to which a plurality of decision-makers operating in different institutions are called upon to provide answers. In this context, traditional interpretative models, regulations, processes and decision-making tools have proved obsolete.

Such approaches to governance and decision-making tend to be characterised by a static perspective (i.e. one that does not take into account the weight of the 'time' variable and the 'trade-off' implications that derive from it), sectorial (i.e. mono-disciplinary), and atomistic (i.e. one that fractionates governance into the sole realm of policies and decisions formulated within individual institutions or individual components of an institution, thereby losing sight of the underlying system perspective of the problems themselves). All this calls for an integrated and multidisciplinary approach, which in the doctoral programme is reflected both within the individual curriculum and at intercurricular level (see especially PHD. 1.2 and 1.4).

Reference AVA 3: D.PHD.1.5

The PhD Course's training and research project is ensured adequate visibility on the pages of the website dedicated to it, where the curricula of the PhD College lecturers, the organisation of the course and the services available to PhD students are also published in special sections.

See the website web: <https://www.unipa.it/dipartimenti/dems/dottorati/dinamicadeisistemi/>

Reference AVA 3: D.PHD.1.6

The PhD programme pursues mobility and internationalisation objectives.

It is consortised with the University of Hanoi, Vietnam.

Prof. Isaac Dyner Rezonzew, from the Universidad de Bogot Jorge Tadeo, Lozano, is a member of the Doctoral Board.

Students are required to undertake research periods abroad at renowned international research institutions: e.g. Institute of Advanced Legal Studies, London; Jesus College, Cambridge; Swiss

Institute of Comparative Law, Lausanne; London School of Economics and Political Sciences, London; Max Planck Institute, Munich.

The period spent abroad for research purposes generally takes place during the second year of the course and lasts on average 6 months (min. 3 months - max. 12 months).

All. 1**Credits table**

Type of activity	Credits recognized	Required certification
Attendance of summer/winter schools or other courses	1 credit every 6 hours (national)/0.5 every 3 hours 1 credit every 4 hours (international)/0.5 every 2 hours	Certificate of attendance
Attendance at conferences/study days/congresses	1 credit every 6 hours (national)/0.5 every 3 hours 1 credit every 4 hours (international)/0.5 every 2 hours	Certificate of participation
Participation in organizational secretariat	3 credits	
Attendance of scheduled teaching classes	1 credit every 6 hours/0.5 every 3 hours	Attendance record
University seminar activities	1 credit every 6 hours/0.5 every 3 hours	Statement from the teaching staff
Seminar activities in extra-university settings	1 credit every 6 hours/0.5 every 3 hours	Certificate of attendance with tutor signature
Research periods at other research organizations/companies/institutions.	0.5 credit per day (national)/0.7 credit per day (international)	Attestation of the host facility
Participation in national and international research projects (e.g. PRIN/Horizon)	15 credits for national projects 25 credits for international projects	Attestation
Teaching activities in UNIPA courses	1 credit for every 2 hours (including lecture preparation activity) up to a maximum of 40 hours per year 1 credit for every 6 hours of examinations 3 credits for master's thesis assistance 1 credit for every 6 hours of student reception and final test assistance	Documentation evidencing the activity
Teaching activities in non-UNIPA courses	1 credit for every 2 hours (including lecture preparation activity) up to a maximum of 40 hours per year	Documentation evidencing the teaching activity
Tutoring	1 credit every 6 hours	Certificate

Journal publication	<p>Article:</p> <p>15 credits (scientific journal) 25 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Note to judgment:</p> <p>10 credits (scientific journal) 15 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Review in journal:</p> <p>2 credits (scientific journal) 4 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Abstract in conference proceedings published in journal:</p> <p>credits (scientific journal) 7 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Contribution in conference proceedings published in journal:</p> <p>10 credits (scientific journal) 15 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Poster published in journal:</p> <p>5 credits (scientific journal) 7 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p> <p>Abstracts in journal:</p> <p>3 credits (scientific journal) 5 credits (Class A Journal or international Journal or classified by ISI or Scopus)</p>	Reprint or acceptance letter
Publication in book	Chapter or essay:	Reprint or acceptance letter

	<p>15 credits</p> <p>Preface/postface: 7 credits</p> <p>Short introduction: 7 credits</p> <p>Entry - in dictionary or encyclopedia: 15 credits</p> <p>Review in book: 2 credits</p> <p>Contribution in conference proceedings published in book: 15 credits</p> <p>Abstracts in conference proceedings published in book 5 credits</p> <p>Poster published in book 5 credits</p>	
Monograph	<p>40 credits (in Italian) 60 credits (in English)</p>	
Reports at conferences, congresses, seminars and study days	<p>5 credits (national) 7 credits (international)</p>	Congress program
Language courses (also Italian language courses for foreign doctoral students)	<p>A2 – 1 credit B1 – 2 credits B2 – 3 credits C1- 4 credits C2 – 5 credits</p>	Language Certification
Research activities - referred to in the annual report - approved by the Teachers' Board for transition to the following year	25 credits	
Doctoral thesis writing	30 credits (+ 20 if in English language)	

