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Name of the course:	Innovation and new industrial policy			
Teacher:	Armanda Cetrulo, Antonio Andreoni, Guendalina Anzolin			
University / organisation:				
Language of teaching:	English			
ECTS:	4			
Semester (S1, S2, S3 or S4):	<input type="checkbox"/> <input type="checkbox"/> S1 <small>1</small>	<input type="checkbox"/> <input type="checkbox"/> S2	<input type="checkbox"/> <input checked="" type="checkbox"/> S3	<input type="checkbox"/> <input type="checkbox"/> S4
Teaching method(s):	<input checked="" type="checkbox"/> Lecture courses		<input type="checkbox"/> <input type="checkbox"/> Flipped classroom	
	Other:			
Type(s) of evaluation²:	<input type="checkbox"/> <input type="checkbox"/> Sitting exam		<input checked="" type="checkbox"/> Written report	
	<input checked="" type="checkbox"/> Oral defence		<input checked="" type="checkbox"/> Group project	
	Other / comments:			
Expected deadline(s) for the evaluation(s)³	December 2023			
Expected date of final results:	January 2024			
Summary of the content⁴:	The course will be divided in two parts: the first part will focus on innovation; the second part will be devoted to industrial policy. In both cases, a combination of theoretical and empirical studies will be discussed to offer a comprehensive perspective of the theoretical framework together with an updated overview of contemporaneous issues. A more detailed outline of content and references of each session follows below.			
Indicative list of lectures⁵:	<p>Session 1 - “Innovation as a complex evolving process: a general overview” (with Armanda Cetrulo)</p> <p>The goal of the first session is to provide a deep understanding of the complex and evolving process of innovation. First, the building blocks of evolutionary theory will be discussed, focusing on the concepts of technological paradigms and evolutionary trajectories. Then, the history of evolutionary thought will be synthetically sketched, highlighting the</p>			

¹ Delete as appropriate.

² If the evaluation of the course includes various assessment methods, tick all the relevant boxes. You can add explanations in the “Other/comments” box.

³ Students need to know approximately when the deadlines for the various steps of the evaluation will be. Please provide the relevant details. E.g. if you organise a sitting exam and ask for a report and oral defence, identify for all three the expected periods which are concerned.

⁴ One or two paragraph(s).

⁵ Provide, if already possible, an indicative list of topics you will cover in each lecture.

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theoretical advances with respect to the mainstream economic literature and depicting future avenues of research.

References

- Dosi, G. (2023) *The foundations of complex evolving economies*. Oxford, Oxford University Press.
- Dosi, G., & Nelson, R. R. (2010). Technical change and industrial dynamics as evolutionary processes. *Handbook of the Economics of Innovation, 1*, 51-127.
- Pavitt, K. (1984). Sectoral patterns of technical change: towards a taxonomy and a theory. *Research Policy, 13*(6), 343-373.
- Breschi, S., Malerba, F., & Orsenigo, L. (2000). Technological regimes and Schumpeterian patterns of innovation. *The Economic Journal, 110*(463), 388-410.
- Nelson, Richard R. *Economics from an evolutionary perspective*. No. 2017/18. LEM Working Paper Series, 2017 (also published in Nelson, R. R., Dosi, G., Helfat, C. E., Pyka, A., Saviotti, P. P., Lee, K., & Malerba, F. (2018). *Modern evolutionary economics: An overview*. Cambridge University Press).
- Lazonick, W., & Mazzucato, M. (2013). The risk-reward nexus in the innovation-inequality relationship: who takes the risks? Who gets the rewards? *Industrial and Corporate Change, 22*(4), 1093-1128.
- Mazzucato (2013) *The Entrepreneurial State. Debunking Public vs. Private Sector Myths*. The Anthem Press (**Chapter 5**)
- Evangelista, R. (2018). Technology and economic development: The Schumpeterian legacy. *Review of Radical Political Economics, 50*(1), 136-153.

Session 2 - “Dynamic capabilities, routines and work organization” (with Armanda Cetrulo)

The process of innovation at the micro-level will be investigated in the second session, presenting the theory of the firm that stresses the role of dynamic capabilities, organizational routines, and heuristics. The main characteristics of the labour process will be assessed in a critical perspective. The linkage between knowledge accumulation and labor market institutions will be investigated empirically, looking at how innovative capabilities can be shaped by learning regimes and workforce characteristics.

References

- Dosi, G., Nelson, R. R., Winter, S. G., & Winter, S. G. (Eds.). (2000). *The nature and dynamics of organizational capabilities*. Oxford University Press (**Selected chapters**).

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- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative science quarterly*, 128-152.
- Arundel, A., Lorenz, E., Lundvall, B. Å., & Valeyre, A. (2007). How Europe's economies learn: a comparison of work organization and innovation mode for the EU-15. *Industrial and corporate change*, 16(6), 1175-1210.
- Cetrulo, A., Cirillo, V., & Guarascio, D. (2019). Weaker jobs, weaker innovation. Exploring the effects of temporary employment on new products. *Applied Economics*, 51(59), 6350-6375.
- Coriat, B., & Dosi, G. (1998). *Learning how to govern and learning how to solve problems: on the co-evolution of competences, conflicts, and organizational routines*, IIASA Working Paper P-95-06 February 1995.
- Dosi, G., Marengo, L., & Virgillito, M. E. (2021). Hierarchies, knowledge, and power inside organizations. *Strategy Science*, 6(4), 371-3.

Session 3 - “Industrial revolutions over time” (with Armanda Cetrulo)

The third session will offer a historical overview of industrial revolutions to better contextualize the on-going discussion on the emergence of a new industrial revolution, the so-called Industry 4.0. The main traits and determinants of the previous industrial revolution will be presented (in particular looking at the British Industrial Revolution), underlining the role played by the different and interdependent socio-economic subsystems.

References

- Freeman, C. and Louçã, F., (2001). *As time goes by: from the industrial revolutions to the information revolution*. Oxford University Press.
- David, F. N. (2017). *Forces of production: A social history of industrial automation*. Routledge.
- Berg, M. & Hudson, P. (2023). *Slavery, Capitalism and the Industrial Revolution*, John Wiley & Sons.

Session 4 - “Technology and labor: New and old societal challenges” (with Armanda Cetrulo)

In this session, the relation between technological change and social division of labor will be deepened. In particular, the growing literature on labor displacement and jobs' inequality will be critically discussed, highlighting the non-deterministic nature of technological change and its multifaceted impact on labor and society. Moreover, taking stock of the discussion made on the complex nature of the innovation process at the micro and macro

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levels, a broader perspective on the actors involved and the role of institutions will be provided at the end of the lecture.

References

- Nuvolari, A. (2019). Understanding successive industrial revolutions: A “development block” approach. *Environmental Innovation and Societal Transitions*, 32, 33-44.
- Cetrulo, A., & Nuvolari, A. (2019). Industry 4.0: revolution or hype? Reassessing recent technological trends and their impact on labour. *Journal of Industrial and Business Economics*, 46(3), 391-402.
- Pianta, M. (2006). Innovation and Employment, in Jan Fagerberg, and David C. Mowery (eds), *The Oxford Handbook of Innovation*, Oxford Academic.
- Vivarelli, M. (2022). *Innovation and employment: a short update* (No. dipe0024). Università Cattolica del Sacro Cuore, Dipartimenti e Istituti di Scienze Economiche (DISCE).
- Autor, D. (2022). The Labor Market Impacts of Technological Change: From Unbridled Enthusiasm to Qualified Optimism to Vast Uncertainty (No. w30074). National Bureau of Economic Research.
- Braverman, H. (1998). *Labor and monopoly capital: The degradation of work in the twentieth century*. NYU Press (**selected chapters**).
- Mishel, L. and J. Bivens (2021). Identifying the policy levers generating wage suppression and wage inequality. *Economic Policy Institute Working Papers*.
- Tubaro, P., Casilli, A. A., & Coville, M. (2020). The trainer, the verifier, the imitator: Three ways in which human platform workers support artificial intelligence. *Big Data & Society*, 7(1), 2053951720919776.
- Krzywdzinski, M. (2021). Automation, digitalization, and changes in occupational structures in the automobile industry in Germany, Japan, and the United States: a brief history from the early 1990s until 2018. *Industrial and Corporate Change*, 30(3), 499-535.
- Delfanti, A. (2021). *The Warehouse. Workers and Robots at Amazon*. London: Pluto Press.

Session 5 - "Industrial policy theory: neglected issues, new realities" (with Antonio Andreoni)

The session will introduce students to the historical evolution of industrial policy rationales and practices. It will reflect on how economic theory and political economy perspectives inform industrial policymaking. Particular emphasis will be given to the role of industrial policy in shaping industries and markets, managing trade-offs and conflicting claims, while unlocking

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opportunities embedded in socio-economic structures. The session will also reflect on the new challenges green industrial policies are addressing.

References

- Chang, Ha-Joon and Andreoni Antonio. 2020. Industrial Policy in the 21st Century. *Development and Change*, 51(2), pp. 324-351.
- Andreoni Antonio and Chang Ha-Joon. 2019. The Political Economy of Industrial Policy: Structural Interdependencies, policy alignment and conflict management. *Structural Change and Economic Dynamics*, vol. 48, pp. 136-150.
- Andreoni Antonio and Chang Ha-Joon. 2021. Brining Production Back into Development: An introduction, *European Journal of Development Research*, 33(2): 165-178.
- Andreoni, Antonio, Ha-Joon Chang, Sue Konzelmann and Alan Shipman. 2018. Introduction to the special issue: Towards a production-centred agenda, *Cambridge Journal of Economics*, 2018, vol. 42, no. 6, pp. 1495–1504
- Andreoni, Antonio. 2020. Technical change, the Shifting Terrain of the ‘Industrial’ and Digital Industrial Policy, in: A. Oqubay, Cramer, C., Chang, H-J., Kozul-Wright, R. (eds.) *The Oxford Handbook of Industrial Policy*, Oxford: Oxford University Press.
- Andreoni, Antonio, Kenneth Creamer, Mariana Mazzucato and Grove Steyn (2022) How can South Africa advance a new energy paradigm? A mission-oriented approach to megaprojects, *Oxford Review of Economic Policy*, 38(2):237-259.

Session 6 “Varieties of Industrial Policy Models and Instruments” (with Antonio Andreoni)

The session will introduce students to the variety of industrial policy experiences across both advanced industrial economies and emerging ones. We will focus on the coordination and governance models, as well as on several policy instruments adopted to finance innovation, scale up technologies and transform industrial systems. The session will also reflect on the specific challenges that middle-income countries face in escaping the so-called middle-income technology trap. The South Africa case will be used as an example.

References

- Andreoni, Antonio. 2016. Varieties of Industrial Policy: Models, Packages and Transformation Cycles, in: Noman, A. and Stiglitz, J. (eds.) *Efficiency, Finance and Varieties of Industrial Policy*, New York: Columbia University Press.
- Andreoni, Antonio and Fiona Tregenna. 2020. Escaping the middle-income technology trap: A comparative analysis of

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industrial policies in China, Brazil and South Africa, *Structural Change and Economic Dynamics*, 2020, vol. 54, pp. 324-340

- Andreoni Antonio, Pamela Mondliwa, Simon Roberts and Fiona Tregenna (2021) Eds., *Structural Transformation in South Africa. The Challenges of Inclusive Industrial Development in a Middle-Income Country*, Oxford University Press, 2021 OPEN ACCESS.
- Andreoni Antonio, Federico Frattini and Giorgio Prodi. 2017. Structural Cycles and Industrial Policy Alignment: The private-public nexus in the Emilian packaging valley (co-authors), *Cambridge Journal of Economics*, vol. 41, no. 3, pp. 881-904.
- Li Yong, Nobuya Haraguchi and Antonio Andreoni (Eds.) *Industrialization as the Driver of Sustained Prosperity*, Vienna: UNIDO
- Oqubay, Cramer, C., Chang, H-J., Kozul-Wright, R. (eds.) *The Oxford Handbook of Industrial Policy*, Oxford: Oxford University Press (2020).

Session 7 “Governing industrial ecosystems, digitalisation and platforms through industrial and competition policy” (with Antonio Andreoni)

The session will introduce students to the emerging industrial ecosystem paradigm and discuss ways in which new business models at the interface of GVCs and digital platforms are reshaping the industrial landscape. We will analyse how digital technologies have been evolving, and in particular how digital platform power and concentration makes necessary to use competition policy alongside industrial policy. We will highlight the importance of thinking through the lenses of an Entrepreneurial-Regulatory State and provide examples of new competition-industrial policy practices.

References

- Andreoni, A. and Roberts, S. 2020. Governing Digital Platform Power for Industrial Development: Towards an Entrepreneurial-Regulatory State, *Cambridge Journal of Economics*, 2022.
- Andreoni, A. and Lazonick, W. (2020) Local Ecosystems and Social Conditions of Innovative Enterprise in: Lin, J. and Oqubay, A. (eds.) *The Oxford Handbook of Industrial Hubs and Economic Development*, Oxford: Oxford University Press
- Andreoni Antonio, Pamela Mondliwa, Simon Roberts and Fiona Tregenna (2021) Eds., *Structural Transformation in South Africa. The Challenges of Inclusive Industrial Development in a Middle-Income Country*, Oxford University Press, 2021 OPEN ACCESS.
- Andreoni, Antonio. 2018. The Architecture and Dynamics of Industrial Ecosystems: Diversification and Innovative Industrial Renewal in Emilia Romagna, *Cambridge Journal of Economics*, 2018, vol. 42, no. 6, pp. 1613–1642

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- Andreoni Antonio and Chang Ha-Joon and Mateus Labrunie. 2021. *Natura non facit saltus: Challenges and opportunities for digital industrialisation across developing countries*, *European Journal of Development Research*, 33(2): 330-370.
- Andreoni, Antonio. 2019. A Generalised Linkage Approach to Local Production Systems Development in the Era of Global Value Chains, with special reference to Africa, in: Kanbur, R., Noman, A. and Stiglitz, J. (eds.) *The Quality of Growth in Africa*, New York: Columbia University Press.

Session 8 - “Industrial Policy in practice: the case of digitalisation” (with Guendalina Anzolin)

The session will introduce industrial policy focusing on digitalisation, as one of the recent fields where governments have been designing and implementing targeted policies (e.g., Industry 4.0 in Germany). Through a brief discussion about what digitalisation means and what the gaps that policies aim at closing are, we will discuss the challenges that policymakers face when addressing multifaceted subjects like digitalisation. As digitalisation is embedded in production processes, we will use as an example digitalisation policies with references to the automotive sector discussing the case of South Africa.

References

- Andreoni, A., Anzolin, G., 2019. *A revolution in the making? Challenges and opportunities of digital production technologies for developing countries*. URL <https://www.unido.org/idr-2020-background-papers>.
- Peerally et al., 2022. *Towards a firm-level technological capability framework to endorse and actualize the Fourth Industrial Revolution in developing countries*. *Research Policy*. <https://doi.org/10.1016/j.respol.2022.104563>
- Barnes J. 2020. *Repositioning the future of the automotive sector in South Africa*. Available at: <https://www.competition.org.za/ccred-blog-digital-industrial-policy/2020/4/20/repositioning-the-future-of-the-south-african-automotive-industry>
- Parschau, C., & Hauge, J. (2020). *Is automation stealing manufacturing jobs? Evidence from South Africa’s apparel industry*. *Geoforum*, 115, 120-131.

Short bibliography: See above