

### FEDERAL UNIVERSITY OF SANTA CATARINA GRADUATE COURSE IN ECOLOGY

**SYLLABUS** 



### SEMESTER 01 / 2025

1. GENERAL INFORMATION						
CODE	COURSE NAME	WORKLOAD - WEEK		WORKLOAD - SEMESTER		
	Invasion ecology	12		60		
	Number of students	Minimum: 4	Maximum: 20	N of credits: 4		

#### 2. SCHEDULE

March, 24: 8-12 am March 25, 26, 27, 28, 31: 8-12 am, 1-5 pm April 1: 8-12 am, 1-5 pm April 15: 8-12 am, 1-5 pm

### **3. PROFESSOR**

Prof. Dr. Michele de Sá Dechoum

## 4. GRADUATE COURSE

Graduate course in Ecology, UFSC

## **5. COURSE OUTLINE**

Theoretical background and conceptualization, historical biogeography and assisted migration of species. Propagule pressure. Invasiveness and invasibility. Impacts of invasive alien species. Pathways and vectors for the introduction and dissemination of invasive alien species. Public policies and strategies for the management of invasive alien species.

# 6. OBJECTIVES

To present and discuss: (1) concepts and the theoretical background of invasion ecology, (2) impacts of invasive alien species, (3) indirect and direct drivers related to the introduction and dissemination of invasive alien species, and (4) the potential application of ecological knowledge for the management of invasive alien species.

## 7. COURSE CONTENT

- Invasion ecology: theoretical background, historical biogeography and assisted migration of species.

- The invasion continuum (introduction establishment invasion).
- Hypotheses in invasion ecology.
- Key factors in invasion ecology.
- Propagule pressure.
- Species invasiveness.
- Habitat invasibility.
- Ecological, social, and economic impacts of invasive alien species.
- Pathways and vectors for the introduction and dissemination of invasive alien species.
- Biological invasions and the Anthropocene direct and indirect drivers.
- Public policies and strategies for the management of invasive alien species.

# 8. DESCRIPTION OF METHODS

All activities will be in-person. Short classes will be taught by the professor in the mornings, which will be followed by discussions on articles. The afternoons will be dedicated to exercises as well as to reading of scientific papers.

### 9. STUDENT ASSESSMENT

The final average will be composed of the following components: final seminar (50%), exercises in groups (25%) and, participation in class (25%).

## **10. COURSE PROGRAM**

Date	Time	Topics
Mar 24	8-12 am	Course and participant presentation. Invasion ecology: concepts, historical biogeography and assisted migration of species. The invasion continuum (introduction – establishment – invasion). Discussion of potential topics for the final seminar
Mar 25	8-12 am	Pathways and vectors for introduction and dissemination of invasive alien species. National database on invasive alien species. Invasive alien species in Brazil
	1-5 pm	Reading assignments and additional exercises
Mar 26	8-12 am	History of invasion science. Hypotheses in invasion science
	1-5 pm	Reading assignments and additional exercises
Mar 27	8-12 am	Key factors in invasion ecology. Propagule pressure. Species invasiveness. Habitat invasibility
	1-5 pm	Reading assignments and additional exercises
Mar 28	8-12 am	Ecological, social, and economic impacts of invasive alien species
	1-5 pm	Reading assignments and additional exercises
Mar 31	8-12 am	Management of invasive alien species. Adaptive management
	1-5 pm	Field class
Apr 01	8-12 am	Biological invasions and the Anthropocene – direct and indirect drivers. Challenges for the management: the human factor. Perspectives for the future
	1-5 pm	Reading assignments and additional exercises
Apr 15	8-12 am	Final seminar presentation
	1-5 pm	Final seminar presentation. Final course discussion. Course evaluation

# **11. REFERENCES**

### **Basic bibliography**

BPBES (2024) Relatório Temático sobre Espécies Exóticas Invasoras, Biodiversidade e Serviços Ecossistêmicos. Dechoum, M.S., Junqueira, A. O. R., Orsi, M.L. (Org.). 1ª edição, São Carlos: Editora Cubo. 293 páginas. https://doi.org/10.4322/978-65-00-87228-6

Dechoum, M.S.; Junqueira, A.O.R.; Orsi, M.L.; Ziller, S.R.; Pivello, V.R.; Zenni, R.D.; Fonseca, A.C.; Vitule, J.; Barros, F.; Ivanauskas, N.M.; Creed, J.; Brito, M.; Bergallo, H.G.; Rocha, R.; Galheigo, F. (2024). Sumário para Tomadores de Decisão do Relatório Temático sobre Espécies Exóticas Invasoras, Biodiversidade e Serviços Ecossistêmicos. Plataforma Brasileira de Biodiversidade e Serviços Ecossistêmicos (BPBES). Editora Cubo. 21pp. doi: https://doi.org/10.4322/978-65-00-87239-2

IPBES (2023). Summary for Policymakers of the Thematic Assessment Report on Invasive Alien Species and their Control of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Roy, H. E., Pauchard, A., Stoett, P., Renard Truong, T., Bacher, S., Galil, B. S., Hulme, P. E., Ikeda, T., Sankaran, K. V., McGeoch, M. A., Meyerson, L. A., Nuñez, M. A., Ordonez, A., Rahlao, S. J., Schwindt, E., Seebens, H., Sheppard, A. W., and Vandvik, V. (eds.). IPBES secretariat, Bonn, Germany. <a href="https://doi.org/10.5281/zenodo.7430692">https://doi.org/10.5281/zenodo.7430692</a>

## Scientific papers

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DECHOUM, M. S.; SAMPAIO, A. B.; ZILLER, S. R.; ZENNI, R. D. 2018. Invasive species and the Global Strategy for Plant Conservation: how close has Brazil come to achieving Target 10? Rodriguesia, v. 69, p. 1567-1576

EHRENFELD, J. G. Ecosystem consequences of biological invasions. Annual Review of Ecology, Evolution and Systematics, v. 41, p. 59–80, 2010

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HULME, P. et al. Grasping at the routes of biological invasions: a framework for integrating pathways into policy. Journal of Applied Ecology V. 45, p. 403–414, 2008

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LEVINE, J. D.; ALDER, P. B.; YELENIK, S. G. A meta-analysis of biotic resistance to exotic plant invasions. Ecology Letters, v. 7, p. 975-989, 2004

LOCKWOOD, J. L.; CASSEY, P.; BLACKBURN, T. The role of propagule pressure in explaining species invasions. Trends in Ecology and Evolution, v. 20, p. 223-228, 2005

LONSDALE, W. M. Global pattern of plant invasions and the concept of invasibility. Ecology, v. 80, n. 5, p. 1522-1536, 1999 PYSEK, P. et al. A global assessment of invasive plant impacts on resident species, communities and ecosystems: the

interaction of impact measures, invading species' traits and environment. Global Change Biology, v. 18, p. 1725–1737, 2012

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SAKAI, A. K. et al. The Population Biology of Invasive Species. Annual Review of Ecology, Evolution and Systematics, v. 32, p. 305-332, 2001

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SIMBERLOFF, D. The role of propagule pressure in biological invasions. Annual Review of Ecology, Evolution and Systematics, v. 40, p. 81–102, 2009

ZALBA, S.M.; ZILLER, S.R. Manejo adaptativo de espécies exóticas invasoras: colocando a teoria em prática. Natureza e Conservação, v. 5, p. 16-22, 2007

ZENNI, R.D.; ZILLER, S. R. An overview of invasive plants in Brazil. Revista Brasileira de Botânica, v. 34, n. 3, p. 431-446, 2011 ZENNI, R. D.; DECHOUM, M. S.; ZILLER, S. R. Dez anos do informe brasileiro sobre espécies exóticas invasoras: avanços,

lacunas e direções futuras. Biotemas, v. 29, p. 133-153, 2016

# <u>Books</u>

DAVIS, M. Invasion biology. Oxford University Press, 2009. 288p ELTON, C. The Ecology of Invasions by Animals and Plants. Springer, 1958. 181p HUI, C.; RICHARDSON, D. Invasion dynamics. Oxford University Press, 2017. 322p LOCKWOOD, J.L.; HOOPES, M.; MARCHETTI, M. Invasion ecology. 2 ed. Wiley-Blackwell, 2013. 466p MYERS, J.H.; BAZELY, D.R. Ecology and control of introduced plants. Cambridge University Press, 2003. 313p RICHARDSON, D. Fifty years of invasion ecology: the legacy of Charles Elton. Wiley-Blackwell, 2011. 432p SIMBERLOFF, D.; REJMÁNEK, R. Encyclopedia of Biological Invasions. Berkeley e Los Angeles: University of California Press, 2011, 792p