

## Online Course on Scientific Writing for Biology (Writing course of scientific articles and theses)



**With a university certification equal to postgraduate course given by Universidad Tecnológica Nacional (UTN) – Argentina (Ordinance S.C. No. 1561/16)**

**Professor in charge:** Dr Aldo Calzolari

B SC in Microbiology and Dr in Biology. Postgraduate professor in scientific writing, project formulation and evaluation, effective oral presentations and brainstorming for theses; academic and technological consultant (1998-now). Secretary of Research and Technology Transfer and Responsible for the Technological Tying Unit in the University of Río Negro (2009-2013); Secretary of Research, Universidad Nacional de Villa María (1997-1999); Director of the Doctorate in Biology, Universidad Nacional del Comahue (2005-2008); Secretary of Research, Postgraduate and Technology Transfer, Facultad Regional Paraná, Universidad Tecnológica Nacional (2016-2017); Director of research groups, Universidad Nacional de Río Cuarto (1986-2000) and others (2002-2014). Organiser at Universidad Nacional de Río Negro. Professor and Researcher of Scientific Writing, Project Formulation and Evaluation, Microbial Genetics, Molecular Genetics, Genetic Engineering, Genetics, Biology and Microbiology at the universities mentioned above (+23 years of teaching seniority). Member of the Academic Committee Specialisation in Science Communication (2009-now). Evaluator at CONEAU (institution that evaluates and gives credit to universities and its training courses). Now: Category I of incentives (the highest). Director of the Scientific Writing Institute (inEC from its acronym in Spanish) and Associate Professor at the University Institute of the Italian Hospital in Buenos Aires.

**Team:** Mrs Albertina Pereyra – Tra. Luciana Muller– BA Jordán Fiorotto – BA Cecilia Feiner – Ph.D. Aldo Calzolari.

**Duration:** Fourteen (16) weeks of lessons, a total of 80 clock hours.

**Justification:** Scientific writing differs considerably from literary, poetic or journalistic writing, even with popular science texts or study manuals. Besides grammatical and spelling rules, criteria such as accuracy, conciseness, coherence or the correct citation of sources (just to mention a few elements), have completely different strategies and tactics of being approached. This field is not appropriately covered by secondary, tertiary and university education, making professionals of biological and related areas in Latin American countries fail when they write scientific-technical documents. Another consequence of this lack of knowledge is the rate of graduation in postgraduate courses and the level of scientific productions, which are a little lower with regard to other regions. This course aims at providing solid elements for scientific writing.

**Teaching strategy and assessment:** It is structured in a *how-not-to-do-something* way, paraphrasing an old and beloved book, *How not to play chess*, by E. Znosko-Borowsky, who showed how to avoid mistakes instead of the right moves. Another central point of this course will be to bring practical elements and work suggestions in order to ease the formulation and evaluation task. Each week theoretical and additional materials and activities will be given, which are intended to increase the critical spirit through the analysis of good and bad examples. Also, in some cases, each student will work on materials provided by them or texts of their own. When necessary, a confidentiality agreement of the data will be given.

The assessment consists of revising and returning the assignments of each unit and the participation in forums as well. The passing mark is seventy (70) out of one hundred (100).

### Objectives:

General objective: Acquisition of concepts on scientific writing, going through the various aspects that shape this activity.

Specific objectives: (a) provide elements for the organization and writing of scientific articles; (b) discuss data presentation formats: table, figures and text; (c) examine the construction of specific discursive elements: introduction, discussion and others; (d) review criteria for bibliographic search; (e) analyse the process of preparation and assessment of the document; (f) review the

processes of submission, peer review and corrections; (g) discuss aspects of ethics, fraud and plagiarism; (h) postgraduate courses.

**Website:** [www.educacioncientifica.com](http://www.educacioncientifica.com)

**Thematic units included in the course and basic contents:**

**Basic contents of the course:** Purpose of science communication. Types of documents. Thesis. Parts or chapters of a thesis. Figures and Tables. Manuscript revision. Manuscript evaluation. Oral presentations. Ethics and fraud. Intellectual property.

**Schedule:**

Week	Unit	Topic	Assignments
1	1	Objectives and general concepts	Video Diploma
	2	Bibliographic search	Assignment 2
2	3	Methodology	Assignment 3
3	4	Findings or Results	Assignment 4
4	5	Introduction and objectives	Assignment 5
5	6	Discussion and conclusions	Assignment 6
6	7	Abstract and Acknowledgements	Assignment 7
7	8	Tables	Assignment 8
8	9	Authorship	Assignment 9*
	10	Ethics and scientific fraud	Assignment 10 Survey 1**
9	11	Figures	Assignment 11
10	12	Bibliographic references	Assignment 12
11	13	Manuscript correction and revision	Assignment 13***
12	14	Heading and keywords	Assignment 14
13	15	Other publication formats	Assignment 15
14	16	Manuscript evaluation	Assignment 16
15	17	Journals' selection criteria, indexation and submission of manuscripts	Assignment 17*
16	18	Patents and intellectual property rights	Assignment 18 Survey 2** Assignment 13bis End of the course
<p>(*) Forum participation. (**) Surveys are anonymous and voluntary. (***) Part of assignment 12 is done in week 16.</p>			

**Syllabus:** This syllabus and the planned topics are presented in thematic units. The basic contents for each unit are included between brackets.

### **Unit 1. Objectives and general concepts**

*(Text characteristics-Plain style-Types of documents-IMRaD method-Organisational strategies).*

1. Introduction and objectives.
2. The need for publication of the results found.
3. Characteristics of the texts. Academic, expository and exposition texts.
4. Characteristics of an academic text: contextual, discursive, semantic and formal.
5. Plain style.
6. Types of documents: articles, monographs, thesis, reports, case reports. Others.
7. IMRaD method.
8. Stages for the preparation of the article or thesis.
9. Geometric structure of scientific articles and theses.
10. Organisational strategies for the project. Style.
11. Use of References.

### **Unit 2. Bibliographic search**

*(Search operators-Libraries and repositories).*

12. Basis of bibliographic searches.
13. Search operators.
14. Strategies for searching bibliography.
15. Online libraries and repositories: MINCyT library, Latindex, SciELO and other bibliographic resources.

### **Unit 3. Methodology**

*(Data variables and validity-Measures-Presentation of methods).*

16. The need to ensure the validity of the data.
17. Data variables and validity.
18. Measures and analysis. Abbreviations.
19. Quality control in qualitative research.
20. Methodology presentation as tables.
21. Methodology references.

### **Unit 4. Findings or Results**

*(Initial, medium and final stages of the results-Reasoning and argumentation-Voice-Numbers in text-Statistics).*

22. Elements.
23. Arranging data in the text.
24. Initial, medium and final stages of Findings or Results.
25. Reasoning. Argumentation.
26. Use of direct quotes to support the arguments.
27. Passive and active voice.
28. The problem of English terms in academic writing in other languages.
29. Phrases and terms to avoid.
30. Use of numbers in a text.
31. Writing based on statistics.

### **Unit 5. Introduction and objectives**

*(Initial and medium stage-Hypothesis-Objectives).*

32. Elements.
33. Initial, medium and final stages of the Introduction or Theoretical Framework. Examples.
34. Hypothesis. Basis of the project.

35. Objectives.
36. The need for harmonization between Objectives and Conclusions.

### **Unit 6. Discussion and conclusions**

*(Validation of hypothesis-Comparisons and contrasts-Arguments-Conclusions-Discussion controls-Future perspectives).*

37. Elements.
38. Validation (or not) of the hypothesis.
39. Comparing data with other authors.
40. Initial, medium and final stages of the Discussion. Examples.
41. Conclusions.
42. Coherence control between hypothesis, objectives and conclusions.
43. Consistency control with Findings or Results.
44. Moderation control.
45. Future perspectives.
46. Guidelines for the evaluation of the Discussion.

### **Unit 7. Abstract and Acknowledgements**

*(Purpose and characteristics of abstracts-Acknowledgements of theses and articles)*

47. Purpose, quality and consistency in abstracts.
48. Abstracts for humans and for computers.
49. Descriptive, informative and structured abstracts.
50. Graphic abstract.
51. Acknowledgement problems.
52. Acknowledgements of articles and theses.
53. Dedications.

### **Unit 8. Tables**

*(Types of Tables-Elements-Table titles).*

54. Text/Table/Figure dilemma.
55. Types of Tables and Figures. When to choose one or the other.
56. Uses of a Table.
57. Criteria for the production of Tables.
58. Elements of a Table. Organization of Tables.
59. Table Titles.
60. Qualitative data tables.
61. Examples of unnecessary Tables, with mistakes and/or constructed in an incorrect way.

### **Unit 9. Authorship**

*(Authorship, characteristics and problems).*

62. Formal definition of author.
63. Authorship functions.
64. Authorship problems.
65. Guidelines for the assessment of the Authorship.

### **Unit 10. Bad scientific conduct**

*(Fraud-Ethical problems-Types of scientific misconduct-Manipulation of figures).*

66. Fraud and lack of ethics.
67. Famous cases of fraud.
68. Types of scientific misconduct.
69. Fraud by manipulating images.
70. When are we committing plagiarism?
71. Practical criteria to include direct quotes in documents.

### **Unit 11. Figures**

*(Types of figures-Characteristics-Multiple Figures-Captions).*

72. Uses of a Figure. Amount of information in a Figure.
73. Types of Figures: Graphics and Images.
74. Graphics characteristics: types of lines, symbols, boxes.
75. Characteristics of the axis. Multiple axis.
76. Graphic fillers. Data enhancement in graphics.
77. Graphics with inserts. Multiple graphics.
78. Distribution of figures on the page.
79. Production of figures with images.
80. Figures to express ideas.
81. Problems of incorrect manipulation of images.
82. Examples of unnecessary Figures, with mistakes and/or constructed in an incorrect way.
83. Software for the production of figures.
84. Legends in Figures.

### **Unit 12. Bibliographic references**

*(Reference systems-Software for references-ISBN-ISSN-DOI).*

85. Reference annotation systems.
86. Footnotes. Advantages and limitations.
87. Notation systems: APA and Vancouver.
88. Citation of electronic documents.
89. Specific software for reference record: Zotero® and Mendeley®.
90. ISBN and ISSN. DOI.

### **Unit 13. Manuscript correction and revision**

*(Aspects of content and form-Revision of diverse topics on correction-Sexism and ethnicity).*

91. Aspects of content: revision of content and theoretical framework.
92. Problems with data. Analysis of possible solutions.
93. Aspects of form: spelling and typography.
94. Problems of style and balance.
95. Lack of connection between parts of the manuscript.
96. Connective elements, omissions and repetitions.
97. Non-sexist writing and ethnicity.
98. Incomplete references.
99. Consistency. Excess of words. Deviations.

### **Unit 14. Heading and keywords**

*(Characteristics-Serial and compound headings and headings with questions-Keywords-Initials and acronyms).*

100. Concept of heading.
101. Inappropriate headings for lack of specificity.
102. Serial and compound headings.
103. Keywords. Link between heading and keywords.
104. Specialised vocabulary.
105. Initials and acronyms in collaborative projects.
106. Guidelines for the evaluation of Headings.

### **Unit 15. Other publication formats**

*(Short publications-Quick publications-Reports-Revisions-Postgraduate theses).*

107. Articles and theses with both results and discussion combined.
108. Case reports.
109. Technical reports: of projects and of scholarships.
110. Revisions and updates.
111. Postgraduate thesis: Specialisation, Master's Degree and Doctorate.

- 112. Elements of a thesis. Appendices.
- 113. Monitoring and evaluating the Thesis.

### **Unit 16. Manuscript evaluation**

*(Peer-review systems-Corrections-Galley proof).*

- 114. Editor's and evaluators' opinions.
- 115. Peer-review systems and assessment criteria.
- 116. Causes of article rejection.
- 117. Corrections. Response to the editor.
- 118. Submission of the corrected manuscript.
- 119. Article acceptance toast.
- 120. Post-article acceptance tasks.
- 121. Galley proof.

### **Unit 17. Journals' selection criteria, indexation and submission of manuscripts**

*(Journals' assessment-Impact factor and other rates-Authors' instructions-Revision and submission).*

- 122. Journals' thematic area and addressees.
- 123. Journals' assessment criteria: editors' committee, coverage, endogeneity, others.
- 124. Scimago Science Report (SCR) and quartiles.
- 125. Impact factor (*Citation Index*) and average life.
- 126. H. *Altmetrics* rate.
- 127. Latindex, SciELO and other systems of journal classification.
- 128. Guidelines for choosing the journal for submission of the manuscript.
- 129. Authors' instructions.
- 130. Manuscript and thesis cover.
- 131. Revision and submission of the manuscript. Submission of digital manuscripts.

### **Unit 18. Patents and intellectual property rights**

*(Industrial and intellectual property registry-Creative Commons-Confidentiality).*

- 132. Patents. INPI (acronym in Spanish), Argentina's National Institute of Industrial Property.
- 133. Other industrial property rights.
- 134. Authors' rights. *Copyright* and *Copyleft*.
- 135. Confidentiality of information.

### **General and specific bibliography**

#### **General Bibliography**

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