UNIVERSIDADE FEDERAL DE GOIÁS
INSTITUTO DE CIÊNCIAS BIOLÓGICAS
PROGRAMA DE PÓS-GRADUAÇÃO EM CIÊNCIAS BIOLÓGICAS

Work Plan – 2022

I. IDENTIFICATION

Course:	**GRADUATE PROGRAM IN BIOLOGICAL SCIENCES**		
Discipline:	**Methods in Cell and Tissue Biology**		
Professor:	**Prof. Manoel Francisco Biancardi**		
Other professors:			
Semester:	**2022.2**		
Theoretical workload:	8h	**Practical workload**:	56h
Language of the discipline	( )Portuguese (X)English ( )Spanish Obs:_____		
Modalities of the discipline	( )Virtual (X)Presential ( )Virtual and Presential		
	(x)Synchronous ( )Assynchronous ( ) Synchronous and Assynchronous		

II. SUMMARY

Introduction to methodology for cell and tissue studies. Cytochemistry principles. Principles of photonic microscopy. Preparation of solutions, stains, and fixatives. Methods of collecting and fixation of biological samples. Methods of impregnation, and paraplast and plastic resin embedding. Microtomy. Cytochemistry methods. Methods in immunohistochemistry. Obtaintion, analysis and interpretation of photomicrographs. Morphometrical and stereological analysis.

III. GENERAL AIM

To teach the theoretical and practical principles that guide the methods in cell and tissue biology, besides the application of these concepts in scientific research.

IV. SPECIFIC AIMS

1) Learning of basic principles related to the processing of biological samples
2) Learning of basic principles of cytochemical reactions
3) Learning of theoretical and practical principles of immunohistochemistry
4) Learning of theoretical and practical principles of immunofluorescence
5) Learning of basic principles on morphology and stereology
6) Debating about the applicability of histological techniques in basic and applied science

V. CONTENT

1) Histological processing
2) Cytochemistry reactions
3) Immunohistochemistry
4) Immunofluorescence
5) Morphometry
6) Stereology
7) Basic notions of statistics applied to scientific research
8) Applicability of histological techniques in basic and applied science

VI. METHODOLOGY

The classes will be exclusively presential. Theoretical classes will be held at Rooms/auditoriums/amphitheaters previously scheduled. Practical classes will be ministered at the Microscopy Laboratory Applied to Reproduction (LaMARe).

VII. PROCESSES AND CRITERIA OF EVALUATION AND EVALUATION'S TIMELINE

The exams will be based on students participation during the classes (theoretical and practical), or in the scientific report related to the content worked in the discipline. Following are both activities necessary to calculate the final grade.

G1 = participation during the classes (theoretical and practical)
G2 = Final report**

Final grade = (**G1** + **G2**)/2 (simple arithmetic mean)

** The **final report** will be based on the results produced from the biological samples, and all the methodologies used during the course. Following are the topics that must be present in the final report: Cover containing the title and the authors's names; Abstract; Introduction, Material and Methods; Results and Discussion; References.
Keep in mind: Each two student (group) must share the same biological sample. In case the student does not have a biological sample, the professor will provide it allowing the student to participate of the discipline.

VIII. TIMELINE *

Dates	Content/Activity	References
10/18/22	**Presentation of the discipline/work plan** **Theoretical class: Methods in cell and tissue biology** Time: 14:00 pm to 18:00 pm	Work plan; Ref. 1 to Ref. 4
10/25/22	**Practical class: Collecting and processing of biological samples** Time: 08:00 pm to 12:00 pm; 14:00 pm to 18:00 pm	Ref. 1 to Ref. 4, and practical classes
11/01/22	**Practical class: Microtomy** Time: 08:00 pm to 12:00 pm; 14:00 pm to 18:00 pm	Ref. 1 to Ref. 4, and practical classes
11/08/22	**Practical class: Cytochemistry** Time: 08:00 pm to 12:00 pm; 14:00 pm to 18:00 pm	Ref. 1 to Ref. 4, and practical classes
11/29/22	**Theoretical class: Microscopy, morphometry, and photodocumentation -** Time: 08:00 pm to 12:00 pm **Practical class: Photodocumentation** – Time: 14:00 pm to 18:00 pm	Ref. 1 to Ref. 9, and practical classes
06/12/22	**Practical class: Photodocumentation** Time: 08:00 pm to 12:00 pm; 14:00 pm to 18:00 pm	Ref. 1 to Ref. 4, and practical classes
12/13/22	**Theoretical class: Immunohistochemistry and immunofluorescence** Time: 08:00 pm to 12:00 pm **Practical class: Immunohistochemistry and immunofluorescence** Time: 14:00 pm to 18:00 pm	Ref. 1 to Ref. 4, and practical classes
12/20/22	**Presentation of the scientific reports** Time: 08:00 pm to 12:00 pm; 14:00 pm to 18:00 pm	Ref. 1 to Ref. 9, and practical classes
12/22/22	**Grade releasing** Time: 08:00 pm to 12:00 pm	---

* The timeline may be changed by the professor if necessary.

IX. REFERENCES

1) Basic

Ref. 1 - Ribeiro, Ciro Alberto de Oliveira; Reis Filho, Herculano Salviano; Grötzner, Sonia Regina. **Técnicas e métodos para utilização prática em microscopia**. 1ª ed., Santos Editora, Santos, São Paulo, 2012.

Ref. 2 - Carvalho, Hernandes Faustino; Recco-Pimentel, Shirlei Maria. **A célula**. 3ª ed., Editora Manole Ltda, Barueri, São Paulo, 2013.

2) Complementary

Ref. 3 - Carneiro, José; Junqueira, Luiz Carlos Uchoa. **Histologia básica**. 12ª ed., Editora Guanabara Koogan, Rio de Janeiro, 2017.

Ref. 4 - Ross, Michael H; Pawlina, Wojciech**. Histologia - texto e atlas: em correlação com Biologia Celular e Molecular**. 7ª ed., Editora Guanabara Koogan, Rio de Janeiro, 2016.

Ref. 5 - S.R. Taboga, A.B. Santos, A.G.R. Gonzatti, B.C. Vidal, M.L. Mello. **Nuclear phenotypes and morphometry of human secretory prostate cells: a comparative study of benign and malignant lesions in Brazilian patients**. Caryologia 3 (2003) 15-322.

Ref. 6 - L.A. Manso, B.C.M. Medeiros, G.A. Rodrigues, J.G. Ramos, M.R. Marques, S.R. Taboga, F.C.A. Santos, M.F. Biancardi. **Testosterone exposure in prenatal life disrupts epithelial nuclear morphology, smooth muscle layer pattern, and FGF10 and Shh expression in prostate**. Life Sciences 2021, Online ahead of print.

Ref. 7 - L.J. Gomes, G.A. Rodrigues, B.C.M. Medeiros**,** L.A. Manso, J.G. Ramos, P.V. de Azevedo Brito, S.R. Taboga, H.F. de Carvalho, F.C.A. dos Santos, M.F Biancardi. **The influence of pregnancy on female prostate morphophysiology in gerbils (*Meriones unguiculatus*)**. Reproductive Sciences 2021, Online ahead of print.

Ref. 8 - R.W. Veltri, C.S. Christudass, S. Isharwal**. Nuclear morphometry, nucleomics and prostate cancer progression**. Asian J. Androl. 14 (2012) 375-384.

Ref. 9 – Moore, David S. A estatística básica e sua prática. 5ª ed., Editora LTC, Rio de Janeiro, 2011.

X. PLACE OF RESULTS RELEASING

The final grade will be released through the SIGAA.

XI. OBSERVATIONS

None.