UNIVERSIDADE FEDERAL DE SANTA CATARINA

CENTRO DE CIÊNCIAS AGRARIAS

PROGRAMA DE PÓS-GRADUAÇÃO EM RECURSOS GENÉTICOS VEGETAIS

EDUCATION PLAN

I. DISCIPLINE IDENTIFICATION:

CODE	DISCIPLINE NAME	NUMBER OF WEEKLESS CLASS-HOURS THEORETICAL	PRACTICE	TOTAL SEMESTER CLASS-HOURS
RGV 3018	Anatomy of vascular plants	40 cl/h	5 cl/h	45 cl/h

I.1. HOURS

THEORY CLASSES	PRACTICAL CLASSES
Monday from 1:30 p.m. to 4:00 p.m.	

II. PROFESSOR (S) MINISTER (S)

Marisa Santos e Cristina Magalhães Ribas dos Santos

II. PRE-REQUISITE (S):

CODE	DISCIPLINE NAME
	No prerequisites

IV COURSE (S) FOR WHICH DISCIPLINE IS OFFERED

Programa de Pós-Graduação em Recursos Genéticos Vegetais

V. EMENTA

Main equipment and methodologies used in plant anatomy. Internal structures and organs that make up the vegetative and reproductive body of pteridophytes, gymnosperms and angiosperms and their correlation with physiology and environmental stimuli that promote development: 1) Plant cell: structure and ultrastructure; 2) Systems of growth (meristem), production and reserve (parenchyma), conduction (xylem and phloem), support (colenchyma and sclerenchyma), coating (epidermis and periderm) and secretion. 3) Organology: root, stem, leaf, flower, fruit and seed.

VI. OBJECTIVES

Allow the student: 1) To identify cellular and tissue structural and ultrastructural aspects of the vegetative and reproductive organs of plants, aiming to correlate the anatomical aspects with the physiology and the environmental stimuli that promote the development of vascular plants. 2) Decide on the best techniques and equipment to be used to achieve the previous goal.

VII. COURSE CONTENT

1. Main equipment and methodologies used in Plant Anatomy.
2. Plant cell - structure and ultrastructure: plasma membrane, nucleus and cytoplasmic organelles (plastids, mitochondria, dictiosomes, peroxisomes, glyoxysomes, ribosomes); endomembrane system, cytoskeleton; vacuoles, ergastic substances and solid inclusions; cell wall (chemical components; pits and primary fields of pits); plasmodesms and intercellular spaces. Plant anatomic and ecophysiological correlations.
3. Growth system - meristems: cellular ultrastructure; cell growth and differentiation; meristematic apex (stem and root); promeristem, protoderm, fundamental meristem and provascular tissue; tunic-corpus

theory; root quiescence center; intercalar meristem; primary and secondary thickening meristems; vascular cambium and phellogen (cork cambium). Plant anatomic and ecophysiological correlations.
4. Coating system - epidermis and peridermis: ordinary epidermal cells (constitution and thickness of cell wall, cellular form, cuticle, epicuticular waxes); stomata (cell constitution, cell types, cell variation in relation to abiotic environment conditions); trichomes (types); specialized epidermal cells (silica cells, cork cells, bulliform cells, cystoliths); origin and constitution of the periderm (phellogen, phelloderm, cork or phellem, rhytidome, lenticels). Plant anatomic and ecophysiological correlations.
5. Production and reservation system - parenchyma: origin, cellular characteristics, functions and types.
6. Support system - colenchyma and sclerenchyma: origin, cellular characteristics, functions and types.
7. Secretory systems (secretory structures) - characteristics, functions and types (salt glands, hydatodes, nectaries, colleters, stigmas, glandular trichomes, glands, secretory ducts and cavities, secretory cells, laticifers). Plant anatomic and ecophysiological correlations.
8. Conduction system - xylem and phloem: origin of primary and secondary structures; Cellular constitution (characteristics and types of tracheal and sieves elements); vascular cambium. Plant anatomic and ecophysiological correlations.
9. Organology - root, stem, leaf, flower, fruit and seed: histological constitution and structural variation in large groups of vascular plants. Plant anatomic and ecophysiological correlations.

VIII. METHODOLOGY OF TEACHING / PROGRAM DEVELOPMENT

Theoretical classes with audiovisual and dialogues; practical work seminar; theoretical proof;
practical class.
The final seminar will be individual and should contain histological aspects of vegetative and / or reproductive organs of a plant species. This work should contain photomicrographs with identification of histological characteristics and should also include their correlation with the physiology and environmental factors that promote the development of the species. The structure of the work should contain: 1) Introduction; 2) Objectives; 3) Material and Methods; 4) Results and Discussion; 5) Conclusion; 6) Bibliographical references (suggested basic literature and relevant articles).

IX. EVALUATION METHODOLOGY

The evaluation of the students will be made from: written proof = weight 30%; seminars = weight 70%.

X. NEW EVALUATION

No further evaluation

XI. THEORETICAL SCHEDULE

Aug, 21	Main equipment and methodologies used in Plant Anatomy
Aug, 28	Plant cell
Sept, 04	Growth system
Sept, 11	Coating system
Sept, 18	Production and reservation system
Sept, 25	Support system - Secretory systems
Oct, 02	Conduction system
Oct,16	Root
Oct, 23	Stem
Oct, 30	Leaf
Nov, 06	Flower
Nov, 13	Fruit and seed
Nov, 20	Written proof
Nov, 27	Seminars

XII. PRACTICAL SCHEDULE

Oct, 09	Plant cell and tissues

XIII. BASIC BIBLIOGRAPHY

APPEZZATO-DA-GLÓRIA, B. & CARVALHO-GUERREIRO, S.M. (eds.). 2003. **Anatomia Vegetal**. Viçosa, Ed. UFV. 438p.

BECK, C.B. 2005. **An Introduction to Plant Structure and Development**. Cambridge, Univertity Press. 431p.

EVERT, R. F. 2006. **Esau's Plant Anatomy: Meristems, Cells and Tissues of the Plant Body – Their Structure, Function, and Development.** 3ªEd. New Jersey, John Wiley & Sons. 601p.

LAMBERS, H.; STUART, F. & PONS, T.L.1998. **Plant Physiological Ecology**. New York, Springers-Verlag. 540p.

LARCHER, W. 2000. **Ecofisioogia vegetal**. São Carlos, Editora Rima. 531p.

MAUSETH,J.D. 1988. **Plant Anatomy**. California, The Benjamin/Cummings Publ. Co.

SOUZA, L.A. 2003. **Morfologia e Anatomia Vegetal: célula, tecidos, órgãos e plântula.** Ponta Grossa, Editora UEPG. 259p.

TAIZ, L. & ZEIGER, E. 2004. **Fisiologia Vegetal.** Porto Alegre, Armed. 722p.

XIII. COMPLEMENTARY BIBLIOGRAPHY

BARROSO, G.M., MORIM, M.P., PEIXOTO, A.L. & ICHASO, C.L.F. 1999. **Frutos e sementes: morfologia aplicada à sistemática de dicotiledônea**. Viçosa, ed. UFV. 443 p.

CORNER, E.J.H. 1976. **The seeds of dicotyledons**. Cambridge, Cambridge University Press. 311 p.

CUTTER, E.G. 1971. **Plant Anatomy: Experiment and Interpretation Part 2: organs.** London, William Clowes & Sons, Limited. 343 p.

CUTTER, E.G. 1978. **Plant Anatomy. Part 1:Cells and tissues.**2ªEd.London, William Clowes & Sons,Limited. 315 p

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EAMES, A.J. & MACDANIELS, L.H. 1947. **An Introduction to Plant Anatomy**. London, MacGraw-Hill Books. 427p.

ESAU, K. 1965. **Vascular differentiation in Plants.** USA, Holt, Rinehart and Winston.160 p.

ESAU,K. 1959. **Anatomia Vegetal.** Barcelona, Ed. Omega. 729p

ESAU,K. 1976. **Anatomia das Plantas com Sementes.** São Paulo, EPU-EDUSP. 193p

FAHN, A.1978. **Anatomia Vegetal.** Madrid, H.Blume Ediciones.643 p

FAHN, A. 1979. **Secretory tissues in plants.** London, Academic Press Inc.Ltd. 302p.

GUNNING, B.E.S. & STEER, M.W. 1996. **Plant Cell Biology. Structure and Function**. London, Jones and Barlett Publishers, Inc. 134p.

HABERLANDT, G. 1928. **Physiological Plant Anatomy.** Reedição. London, Macmillan. 777p.

METCALFE, C.R. & CHALK, L. 1979. **Anatomy of the Dicotyledons.** Vol. I. 2ª Ed. Claredon Press, Oxford. 294 p.

METCALFE, C.R. & CHALK, L. 1983. **Anatomy of the Dicotyledons.** Vol. II. 2ªEd. Claredon Press, Oxford. 109 p.

NICK, P. (Ed.). 2000. **Plant Microtubules. Potential for Biotechnology.** Berlin, Springer-Verlag. 201p.

NOBEL, P.S. **Plant Physiology. Physicochemical and Environmental**. 4ªEd. Los Angeles, Academic Press. 604p.

PETERSON, R,L.; PETERSON, C.A.; MELVILLE, L.H. 2008. Teaching plant anatomy through creative laboratory exercises. NRC Press, Ottawa, Ontario. 154p.

ROTH, I. 1976. **Anatomia de las Plantas Superiores.** Caracas, Ed.Biblioteca Univ. Central de Venezuela. 357 p.

RUDALL, P. 2007. **Anatomy of Flowering Plants – An Introduction to Structure and Development.** 2ªEd. Cambridge, Cambridge University Press. 110p.

SOUZA, L.A. (org.) 2006. **Anatomia do Fruto e da Semente.** Ponta Grossa, Editora UEPG. 196p.

SOUZA, L.A. (org.) 2009. **Sementes e Plântulas. Germinação, estrutura e adaptação.** Ponta Grossa, Editora UEPG. 279p.

STEWARD, F.C. (Ed.). 1969. **Plant Physiology.** London, Academic Press. 462p.

Note: specific scientific articles will be mentioned in due course.