

Online Courses in English at UFV

Term: 2022-1

When?

March 7 – July 1, 2022 (most courses, see exceptions below)

Who is eligible?

- “**Academic mobility**”: undergraduate, Master’s or Ph.D. students currently enrolled in any Higher Education Institution.
- “**Diploma holders**”: individuals holding a bachelor’s degree granted by any Higher Education Institution.

Steps for the application process:

1. Before **February 5**, fill up the application form, uploading the required documentation:
 - a. For academic mobility students: <https://forms.gle/4zduUqBqQ1FfBWSd8>
 - b. For diploma holders: <https://forms.gle/krhXyppgXy3aqcRpG7>
2. The coordinator of each UFV requested course will evaluate your application, based on your curriculum vitae and transcript of records.
3. Before **March 4**, the UFV international office will inform you the list of courses you are approved to register for.
4. Classes will start on **March 7**, 2022 (except for INF100, which starts on **May 2**, 2022).

IMPORTANT:

- Good internet connection is mandatory to follow the activities!
- For academic mobility, one of the required documents is an official nomination from the home institution. “Self-nominated” candidates are not accepted for academic mobility.
- The program does not provide a degree - students who conclude courses will receive only an official transcript of records from UFV.

Courses

CODE	NAME	LECTURERS	
CBF 770	Plant Stress Physiology	Eduardo Gusmão	egpereira@ufv.br
CIV 642	Biological Wastewater Treatment Processes	Ann H. Mounteer	ann@ufv.br
ENT 662	Insect Physiology	Eugenio E. Oliveira	eugenio@ufv.br
ENT 774	Insect-Microbe Interactions	Simon Luke Elliot	selliot@ufv.br
FIT 632	Plant Cell and Tissue Culture	Sérgio Yoshimitsu Motoike	motoike@ufv.br
FIT 678	Genetic Data Analysis	Guilherme da Silva Pereira	g.pereira@ufv.br
FIS 651	Electromagnetic Theory II	Winder A. de M. Melo	winder@ufv.br
FIS 690	Soft Matter Physics	Márcio Santos Rocha Leandro Guitierrez Rizzi	marcios.rocha@ufv.br lerizzi@ufv.br
INF 100	Introduction to Programming	Vladimir Oliveira Di Iorio	vladimir@ufv.br
LET 604	Portuguese for Foreigners	Idalena Chaves	idalena@ufv.br
MBI 610	Microbial Physiology	Antônio Galvão do Nascimento	agalvao@ufv.br
ZOO 791	Introduction to Animal Breeding	Slmone E. F. Guimarães	sfacioni@ufv.br

Timetable: UTC -03:00

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00h	FIT 632		CIV 642	FIT 678	

			ENT 774	ENT 774	
9:00h	FIT 632		CIV 642	FIT 678	
	ZOO 791		ENT 774	ENT 774	
10:00h	FIT 632	MBI 610	CIV 642		MBI 610
	ZOO 791	INF 100	FIT 678		INF 100
	LET 604		LET 604		CBF 770
11:00h	FIT 632	MBI 610	CIV 642		MBI 610
	ZOO 791	INF 100	FIT 678		INF 100
	LET 604		LET 604		CBF 770
12:00h					
13:00h					
14:00h		ENT 662			ENT 662
15:00h		ENT 662			ENT 662
16:00h					
17:00h					

OBS:

- For FIS 651 and FIS 690, the timetable will be defined later by the lecturer after discussing with the students enrolled.
- All classes will take place from **March 7 to July 1, 2022**, EXCEPT the classes for INF 100, which will take place from **May 2 to August 5, 2022**.

TOPICS

CBF 700 - Plant Stress Physiology (45h)

1. Plant stress responses.
2. Metabolic adjustments and antioxidant metabolism.
3. Light stress and thermic stress.
4. Water stress and salinity.
5. Nutritional stress and resistance to trace metals.
6. Environmental pollution stress.

CIV 642 - Biological Wastewater Treatment Processes (60h)

Course objectives are to be able to analyze and model biological wastewater treatment processes, plan and evaluate monitoring and operational control programs and biological process optimization studies. Topics that will be discussed include applicability of biological processes, microbial ecology and bioenergetics of wastewater treatment, quantification and characterization of microorganisms, bioreactor hydraulics and kinetics, wastewater treatability studies. Processes focused on: anaerobic reactors, stabilization ponds, activated sludge, trickling and submerged aerobic filters and biological nutrient removal.

ENT 662 – Insect Physiology (60h)

1. Size, scale and morphological adaptations.
2. Embryonic and post-embryonic development.
3. Tegument and Metamorphose (and its hormonal regulation).
4. Diapause and biological rhythms.
5. Reproductive system.
6. Sensory systems.
7. Locomotion (including muscles physiology) and nervous system.
8. Insect flight and migratory movements.
9. Insect nutrition and digestive system.
10. Hemolymph, circulatory and immunological systems.
11. Gas exchange (respiration) and temperature control systems.
12. Excretory system.

ENT 774 – Insect-Microbe Interactions (60h)

1. Introduction to Insect-Microbe Interactions (What is symbiosis? Parasitism and mutualism as a continuum | Modes of transmission of symbionts | Theory on evolution of virulence | Types of parasitism: castration, gigantism etc, host manipulation | Immune defence | Insects as vectors: plants versus animals and vectors as hosts | Types of mutualism | An overview of applications (microbial control and biotechnology))

2. Insect-Virus Interactions (Baculoviruses and other occluded viruses | Arthropod vectors of plant viruses | Arthropod vectors of animal viruses | Mutualistic or nonpathogenic viruses (or their remnants))
3. Insect-Prokaryote Interactions (Bacillus thuringiensis | Other bacilli and other bacterial pathogens | Wolbachia and other sex ratio distorters | Bacteria as defensive and trophic mutualists | Insects as vectors of prokaryotes)
4. Insect-Protist Interactions (Protists as pathogens and trophic mutualists)
5. Insect-Fungus Interactions (Entomophthoraceae - obliged to kill | Hypocrealean pathogens | Trophic mutualisms and fungiculture | Insects, endophytes and phytopathogenic fungi | Microsporidia)
6. Insect-nematode interactions (Nematode parasites of insects | Nematode pathogens with bacterial mutualisms)
7. Extensions (The insect microbiome and food webs | Production of entomopathogens | Biotechnological applications | Management of vectorborne diseases | Diseases of beneficial insects)

FIT 632 – Plant Cell and Tissue Culture (60h)

1. Plant cell and tissue culture: definition, history and applications.
2. Plant cell and tissue culture facilities: organization of a tissue culture laboratory, equipment and supplies and basic techniques.
3. The components of plant tissue culture media: mineral components, organic components, plant growth regulators, gelling agents, pH. Organogenesis: definition, organogenesis process, developmental sequences, control and examples.
4. Somatic embryogenesis: definition, somatic embryogenesis process, developmental stages, control of embryogenesis and examples.
5. Micropropagation: applications, types, stages and limitations.
6. In vitro clonal cleanse: techniques and applications.
7. Variations in plant tissue culture: somaclonal variations, epigenetic variations, origin of the variations, control of the variations, examples.
8. Mutagenesis in vitro: induction methods, selection of mutants, application of in vitro mutagenesis in plant breeding.
9. Embryo rescue and culture: applications and culture techniques.
10. In vitro germplasm Conservation: importance, methods and applications.
11. Production of haploids plants in vitro.
12. In vitro protoplast culture: protoplast isolation and cultivation, protoplast fusion.
13. Plant transformation: plant tissue culture as pre-requisite for transformation,
14. Agrobacterium-mediated transformation, gene gun, electroporation, virus mediated method.

FIT 678 – Genetic Data Analysis (60h)

1. Introduction to genetic data analysis;
2. Molecular markers;
3. Mapping populations;
4. Linkage map;
5. QTL mapping;
6. Genetic data analysis of outcrossing species;
7. Genome-wide association studies;
8. Genomic selection;
9. Genetic data analysis of autopolyploid species.

FIS 651 – Eletromagnetic Theory II (60h)

1. The formalism of special relativity.
2. Dynamics of relativistic particles.
3. Radiation of moving charges.
4. Canonical formulation of Electromagnetism and conservation laws.

FIS 690 – Soft Matter Physics (60h)

1. Intermolecular forces.
2. Self-organized systems and phase transitions.
3. Polymers. Surfaces and surfactants.
4. Brownian motion and thermal fluctuations.
5. Diffusion and permeation in soft matter.
6. Rheology in soft matter.
7. Ionic soft matter.

INF 100 – Introduction to Programming (60h)

1. Elements of an algorithmic language.
2. Basic commands (assignment, conditional, repetition).
3. Arrays.
4. Functions.

(The language adopted is Python)

LET 604 - Portuguese for Foreigners (60h)

1. Listening comprehension and analysis of oral texts, in Portuguese.
2. Production of oral texts.

3. Analysis of academic written texts.
4. Reading and interpretation of written texts.
5. Writing texts related to several academic genres (abstracts, conference presentations, bibliographical essays, journal articles, conference proceedings, etc.)
6. Vocabulary and grammar.
7. Preparation for the Portuguese language proficiency exam for foreigners (Celpe-bras).

MBI 610 – Microbial Physiology (60h)

8. Microbial cell structure and function.
9. Composition, organization and physiology of microbial cells.
10. Nutrient transport and protein secretion.
11. Growth of microbial populations.
12. Thermodynamics and energy conservation in biological systems.
13. Introduction to cellular bioenergetics.
14. Electron transport.
15. Bioenergetics in the cytosol.
16. Classification of microbial metabolism.
17. Central metabolic pathways.
18. Flux in central metabolic pathways.
19. Fermentations.
20. Autotrophy.
21. Mineral nutrition.
22. Monomer biosynthesis.
23. Polymer biosynthesis.
24. Growth yield.
25. Regulation of metabolic pathways.
26. Multigene networks and global regulation systems.
27. Nutrient limitation responses and growth rate effects on cellular physiology.
28. Environmental adaptive responses.
29. Cellular communications and biofilms.
30. Cellular differentiation and morphogenesis.

ZOO 791 – Introduction to Animal Breeding (45h)

1. Definition of animal breeding;
2. How can animal breeding help in animal production?
3. Genetic parameters in animal breeding;
4. Correlation, inbreeding and crosses;
5. Genomics applied to animal breeding;
6. Breeding and genomics applied to the main livestock species: cattle (beef and milk), pigs, poultry, horses.