UNIVERSIDADE DO ESTADO DE SANTA CATARINA
CENTRO DE CIÊNCIAS TECNOLÓGICAS – CCT

*Bachelor in Electrical Engineering – Department of Electrical Engineering*
*Professor Aleksander S. Paterno*
*Center for Science and Technology – Santa Catarina State University*
*Centro de Ciências Tecnológicas – Universidade do Estado de Santa Catarina – CCT/UDESC*

# Syllabus – Signals and Systems

"EMENTA" - ***Main goals:***
After finishing the course, the student should be able to represent, visualize e analyze continuous and discrete signals and the response and characteristics of linear systems, in addition to modelling engineering problems with the help of the studied tools.

This course is offered in English and has its equivalent in the SIS0001 course offered in Portuguese by the Department of Electrical Engineering at the Center for Science and Technology – Santa Catarina State University (CCT-UDESC) in Joinville, Brazil.

**"**METODOLOGIA" - ***Methodology***: Learning and teaching strategies will allow the development of the learning results (from now on, only LR). *Signals and Systems* course will be offered using *Problem Based (inspired) Methodologies, when the students would gather in groups to discuss during class the problems and will be supervised by the professor to indicate and work the solutions. It is recommended that cooperative work be developed in some activities. In addition to such sessions, lectures talking about the main contents of the course will be organized and presented by the professor. Practical sessions will be organized in laboratories with computers or other instruments, when the students will apply their knowledge and develop it further in a programming language platform (either MATLAB, Python, or one most convenient to the student).*

"INÍCIO": ***Course begin – after March 21st, 2023***
***Course meeting times – at least twice a week – 100minutes of lecture and presentation and 100minutes of activities in the computer laboratory.***

***Assessment*:**
In the beginning of the course, students will be presented the list of Learning Results and what is going to be assessed during their development. *Mainly, problems will be proposed and the solution, usually with the help of a computer, will be provided by the students and theoretical aspects of the course may be evaluated in the end of the class by an electronic questionnaire or by oral or written presentation of the response by the student.*

"PROGRAMA"
List of LR for Signals and Systems followed by the topics of study:
LR01 Classify, represent and describe common signals in engineering;
LR02 Use Fourier Transform to analysis and synthesis of discrete and continuous signals
LR03 Characterize systems with respect to its properties of linearity, time variance, causality, memory and stability
LR04 Elaborate and solve difference equations in time and frequency domain
LR05 Use convolution in discrete and continuous time to obtain linear time invariant systems response;
LR06 Analyze discrete and continuous signals and systems
LR07 Characterize systems that sample signals while using the sampling theorem and configure discretized signals

Topics to be explored during the course
TE01 Complex number and useful mathematical formulas

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TE02 Basic continuous and discrete time signals
TE03 Operations on and properties of continuous signals in time domain
TE04 Operations on and properties of discrete signals in time domain
TE05 Discrete and continuous time systems
TE06 Systems' properties
TE07 Discrete and continuous convolution in linear time invariant systems
TE08 Laplace transform and its inverse
TE09 Analysis and synthesis of signals with Fourier series
TE10 Analysis and synthesis with the Fourier transform
TE11 Z transform and its inverse
TE12 Applied Signals and Systems in the computer

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