Title:	Programming High Integrity Systems
Short Code:	EVA_PHIS
ECTS Credits:	2
UAS:	ZHAW
Organizer Details:	MRU InES
Evaluation:	Oral Presentation
Decision Date:	5 October 2020
Start Date:	2 November 2020
End Date:	18 December 2020
Date Details:	
Type:	Seminar / Workshop
Language(s):	English by default
Description (max. 300 characters):	Special programming techniques and special understanding of error sources is required for the programming of high integrity systems. In this EVA we look at techniques to produce safe and dependable code, algorithms and architectures.
Contents and Learning Objectives:	Producing high integrity code requires careful consideration of tools, techniques, runtime platforms and best practices. In this module we introduce the student to coding techniques and structures that facilitate generation of applications that must function with high integrity in critical and mixed-criticality systems.

Contents:

- Algorithms and Applications: Cyclomatic complexity, process, patterns, verification, validation, function points, reliability predictions
- Tools: Pitfalls of C programming and High Integrity SW workflow, compilers, static code checkers, code generators
- Runtime environments: Operating systems, hypervisors, application architectures
- Exercises based on practical problems
    - Complexity reduction
    - Reliability prediction
    - High integrity coding in C

Learning Objectives:

- Students can describe the concepts of cyclomatic complexity and how it relates to verification and validation of code and components.

- Students can explain the failure scenarios of programming languages and compilers, understand and use static code checkers and program code generators.
- Students can explain the run-time environments and their architectures required in both critical and mixed-criticality systems.

Admission:	Electrical and Mechatronic Engineers, Computer and Data Scientists
Literature:	Literature list will be provided
Conditions:	40% theory / discussion, 60% labs / work in teams
Contact:	Prof. Hans Dermot Doran
Contact Person E-Mail:	donn@zhaw.ch
Status:	registration open
Specialization:	Computer Science (CS)
	Data Science (DS)
	Electrical Engineering (EIE)
	Mechatronics & Automation (MA)