

Learning outcomes mapping of F59/17-IZMC course

Teaching tools	Title	Duration (min)	EU Module	EU Learning outcome
Lecture	Zebrafish and Medaka as biomedical models	30	4	3.1.1; 4.3; 4.11; 11.5; 23.22 3.1.1; 4.10; 4.11; 7.5; 7.9; 23.22
Lecture	History and ethics of animal experimentation	30	2 / 9	2.1; 2.2; 2.3; 2.4; 9.1; 9.2; 9.3; 9.4; (9.5); 9.7
Lecture	Animal welfare, the 3Rs and Alternative Methods	30	2	2.1; 2.5; 2.6; 2.7; 2.8; 2.10; 2.11; 2.12; 2.13; 2.14; 11.10; 11.14; 9.2; 23.4
Lecture	Biology of Medaka, husbandry and breeding	60	3.1 / 4	3.1.1; 3.1.2; 3.1.4; 3.1.5; 3.1.8; 4.1; 4.2; 4.3; 4.4; 4.5; 4.6; 4.11; 7.9; 23.5
Lecture	Biology of zebrafish	45	3.1 / 4	3.1.1; 3.1.2; 3.1.4; 3.1.5; 3.1.8; 4.1; 4.2; 4.3; 4.4; 4.5; 4.6; 7.9; 23.5
Lecture	Zebrafish husbandry and breeding	45	3.1 / 4	3.1.1; 3.1.2; 3.1.4; 3.1.5; 3.1.8; 4.1; 4.2; 4.3; 4.4; 4.5; 4.6; 7.9; 23.5
Practical	Breeding Zebrafish and Medaka. Feeding Zebrafish and Medaka Setting up Artemia. Setting up breeding colony of snails. Keeping track of Fish	45	3.2 / 23	3.1.9; 3.2.1; 7.1; 7.3; 23.1; 23.3; 23.6; 23.7; 23.8; 23.16; 23.18; 23.19
Practical/Demonstration	Collection, Cleaning, Microinjections, microscopy and staging of zebrafish and Medaka eggs	105	4	3.1.1; 3.1.2; 3.1.4; 3.1.5; 3.1.8; 3.2.1; 4.1; 4.10; 4.11; 8.1; 23.1; 23.24
Lecture	Recognition of pain, suffering and distress	60	5	1.11; 5.1; 5.2; 5.3; 5.4; 5.5; 2.9; 3.1.1; 21.21; 23.23
Lecture	Regulatory aspects of animal experimentation in Germany	60	1	1.1; 1.2; 1.3; 1.4; 1.5; 1.6; 1.7; 1.8; 1.9; 1.10; 1.12; 2.5; 2.8; 3.1.8; 4.11; 6.1.2; 6.1.3; 7.7; 7.8; 11.11; 11.16; 23.28

Seminar/ Tutorial	How to write a project application for authorization	60	11	1.3; 11.1; 11.4; 11.5; 11.6; 11.7; 9.6; 23.19
Lecture	Other fish species in biological and biomedical research	45	4	3.1.1; 3.1.7; 4.3; 11.5
Lecture	Health monitoring and quarantine.	60	4 / 23	4.1; 4.2; 4.5; 4.9; 23.10; 23.11; 23.12; 23.13; 23.14; 23.15; 23.2
Lecture	Transgenesis and mutagenesis including regulatory issues	45	7 / 23	7.2; 7.5; 7.9; 23.22; 23.24
Lecture	Anesthesia and Euthanasia	45	6.1 / 20	20.1; 20.2; 20.3; 20.4; 20.6; 20.9; 20.10; 20.11; (20.12); (21.1); 6.1.1; 6.1.2; 1.2; 5.6; 7.2
Lecture	Fish and Toxicology	45	3.1	3.1.1; 3.1.2; 3.1.4; 4.11; 11.5
Practical/Demonstration	Bleaching of Zebrafish, Medaka and Snail eggs. Identification of sick fish. Anesthesia and Euthanasia in Zebrafish and Medaka	75	3.1 / 4 / 6.1 / 6.2 / 8 / 20	3.1.1; 3.1.2; 3.1.5; 3.1.6; 3.2.1; 4.1; 4.5; 4.6; 4.9; 6.1.1; 6.1.2; 6.1.3; 6.2.1; 6.2.2; 7.6; 8.1; 8.2; 8.3; 20.9; 20.10; 20.11; 20.13
Lecture	Directive 2010/63/EU on the protection of animals used for scientific purposes	45	1	1.1; 1.2; 1.3; 1.4; 1.5; 1.8; 1.10; 1.12; 2.10; 11.11
Lecture	Statistics	30	10	10.5; 10.6; 11.4; 11.5
Practical	Statistic exercises	60	10	10.5; 10.6; 11.5
Demonstration	Zebrafish Sperm Freezing and In-vitro Fertilization & Shipping embryos and adult fish	60	23	3.1.2; 23.20; 23.24; 23.25; 23.26; 23.27; 4.12; 7.9; 11.2; 11.15
Demonstration	Screening center	60	7	7.4