

Study plan

Name of study plan: Sustainable Constructions under Natural Hazards and Catastrophic Events

Faculty/Institute/Others:

Department:

Branch of study guaranteed by the department: Sustainable Constructions under Natural Hazards and Catastrophic Events

Garantor of the study branch: prof. Ing. František Wald, CSc.

Program of study: Civil Engineering

Type of study: Follow-up master full-time

Required credits: 90

Elective courses credits: 0

Sum of credits in the plan: 90

Note on the plan: Suscos

Name of the block: Compulsory courses

Minimal number of credits of the block: 70

The role of the block: Z

Code of the group: MA_SUSCOS_1P

Name of the group: SUSCOS, 1st semester, compulsory subjects

Requirement credits in the group: In this group you have to gain 20 credits

Requirement courses in the group: In this group you have to complete at least 4 courses

Credits in the group: 20

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
1341C01	1C1 Design of Sustainable Constructions	Z,ZK	6	2P+2C	1	z
1341C02	1C2 Conceptual Design of Buildings	Z,ZK	6	2P+2C	1	z
1341C03	1C3 Conceptual Design of Bridges	Z,ZK	6	2P+2C	1	z
1341C04	1C4 Local Culture and Language	Z	2	2P+2C	1	z

Characteristics of the courses of this group of Study Plan: Code=MA_SUSCOS_1P Name=SUSCOS, 1st semester, compulsory subjects

1341C01	1C1 Design of Sustainable Constructions	Z,ZK	6
1341C02	1C2 Conceptual Design of Buildings	Z,ZK	6
1341C03	1C3 Conceptual Design of Bridges	Z,ZK	6
1341C04	1C4 Local Culture and Language	Z	2

Code of the group: MA_SUSCOS_2P

Name of the group: SUSCOS, 2nd semester, compulsory subjects

Requirement credits in the group: In this group you have to gain 20 credits

Requirement courses in the group: In this group you have to complete at least 4 courses

Credits in the group: 20

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
1262C11	2C11 Business Economics and Entrepreneurship	Z,ZK	2	2P+2C	2	z
1322C09	2C9 Design for Seismic and Climate changes	Z,ZK	6	2P+2C	2	z
1342C08	2C8 Advanced Design of Steel and composite structures	Z,ZK	6	2P+2C	2	z
1342C10	2C10 Design for Fire and Robustness	Z,ZK	6	2P+2C	2	z

Characteristics of the courses of this group of Study Plan: Code=MA_SUSCOS_2P Name=SUSCOS, 2nd semester, compulsory subjects

1262C11	2C11 Business Economics and Entrepreneurship	Z,ZK	2
1322C09	2C9 Design for Seismic and Climate changes	Z,ZK	6
1342C08	2C8 Advanced Design of Steel and composite structures	Z,ZK	6
1342C10	2C10 Design for Fire and Robustness	Z,ZK	6

The aim of this course is to give students an understanding of the design methods of structures at accidental situations, fire and explosion. The course is focussed on all design methods involved in fire design: prediction of fire scenario, evaluation of fire load, calculation of gas temperatures in the fire compartment and structural analysis. Special attention is paid to fire modelling when several design models is presented including nominal temperature curves, simple models and advanced models. Gas temperature in the fire compartment is considered as basis for the structural design. Methods for prediction of temperature of the structural elements are presented and mechanical properties of structural materials (steel, concrete, timber and aluminium structures) are presented. Design models for steel, concrete, steel concrete composite, timber and aluminium structural elements loaded by tension, compression and bending moment are presented. Attention is paid to protection of steel and timber structures to fire, various methods of protection are described. Smaller part of the course is focussed on explosions. Types of explosions are described together with design models. Basic principles of structural analysis are presented. Design methods are explained with focus to increase robustness of the structure. The theoretical part is supplemented with practical exercises using simple design models with aim to apply the knowledge in design of simple structural elements. Understanding of basic principles of structural analysis and design of steel, concrete and timber structures is necessary.

Code of the group: MA_SUSCOS_3P

Name of the group: SUSCOS, 3rd semester, diploma project

Requirement credits in the group: In this group you have to gain 30 credits

Requirement courses in the group: In this group you have to complete at least 1 course

Credits in the group: 30

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
1343C12	3C12 Theses	Z	30	24C	3	z

Characteristics of the courses of this group of Study Plan: Code=MA_SUSCOS_3P Name=SUSCOS, 3rd semester, diploma project

1343C12	3C12 Theses	Z	30
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Final project for Erasmus mundus master course SUSCOS.

Name of the block: Compulsory elective courses

Minimal number of credits of the block: 20

The role of the block: S

Code of the group: MA_SUSCOS_1V

Name of the group: SUSCOS, 1st semester, facultative subjects

Requirement credits in the group: In this group you have to gain 10 credits

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 10

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
1341E05	1E5 Advanced Design of Glass Structures	Z,ZK	5	2P+2C	1	s
1341E07	1E7 Rehabilitation and Maintenance of Structures	Z,ZK	5	2P+2C	1	s
1342E12	2E12 Design for Renewable Energy Systems	Z,ZK	5	2P+2C	1	s

Characteristics of the courses of this group of Study Plan: Code=MA_SUSCOS_1V Name=SUSCOS, 1st semester, facultative subjects

1341E05	1E5 Advanced Design of Glass Structures	Z,ZK	5
1341E07	1E7 Rehabilitation and Maintenance of Structures	Z,ZK	5
1342E12	2E12 Design for Renewable Energy Systems	Z,ZK	5

Code of the group: MA_SUSCOS_2V

Name of the group: SUSCOS, 2nd semester, facultative subjects

Requirement credits in the group: In this group you have to gain 10 credits

Requirement courses in the group: In this group you have to complete at least 2 courses

Credits in the group: 10

Note on the group:

Code	Name of the course / Name of the group of courses (in case of groups of courses the list of codes of their members) <i>Tutors, authors and guarantors (gar.)</i>	Completion	Credits	Scope	Semester	Role
1332E13	2E13 Advanced Design of Concrete structures	Z,ZK	5	2P+2C	2	s
1341E06	1E6 Advanced Design of Timber structures	Z,ZK	5	2P+2C	2	s
1342E14	2E14 Design of Aluminium and Stainless steel structures	Z,ZK	5	2P+2C	2	s

Characteristics of the courses of this group of Study Plan: Code=MA_SUSCOS_2V Name=SUSCOS, 2nd semester, facultative subjects

1332E13	2E13 Advanced Design of Concrete structures	Z,ZK	5
1341E06	1E6 Advanced Design of Timber structures	Z,ZK	5
1342E14	2E14 Design of Aluminium and Stainless steel structures	Z,ZK	5

The course will supply students with basic information on material bases, behaviour and design of load bearing civil engineering structures from aluminium alloys and stainless steels. Expansion of structures made of aluminium alloys and stainless steels during last decades will be demonstrated and advantages per chance drawbacks of using these materials will be discussed. The first part of the course will be devoted to structures from aluminium alloys. Selection of suitable materials for given structure, material properties and application examples will be provided. Subsequently primary information on design in accordance with Eurocode 9 (Design of aluminium structures) will supply students with view concerning differences with respect to design of steel structures. Heat affected zone softening (HAZ) will be shown and corresponding effect on design. The course will cover design from the view of both ultimate and serviceability limit states, including design of various types of connections. Finally advanced models beyond elastic limit will be demonstrated and further possibilities of design using educational programme TALAT and others will be provided. The second part of the course will be devoted to structures from stainless steels. Trends in design using stainless steels and recent notable structures will be discussed. Again a survey of general stainless steel materials and those suitable for civil engineering structures will be provided. The information on design will follow Eurocode 3 (General rules - Supplementary rules for stainless steels) and recommendations of Euro Inox. The course will cover design from the view of both ultimate and serviceability limit states, including design of various types of connections. Special attention will be given to erection and installation of stainless steel structures in respect to need of specific treatment, handling and storage of stainless steel elements and structures.

List of courses of this pass:

Code	Name of the course	Completion	Credits
1262C11	2C11 Business Economics and Entrepreneurship	Z,ZK	2
1322C09	2C9 Design for Seismic and Climate changes	Z,ZK	6
1332E13	2E13 Advanced Design of Concrete structures	Z,ZK	5
1341C01	1C1 Design of Sustainable Constructions	Z,ZK	6
1341C02	1C2 Conceptual Design of Buildings	Z,ZK	6
1341C03	1C3 Conceptual Design of Bridges	Z,ZK	6
1341C04	1C4 Local Culture and Language	Z	2
1341E05	1E5 Advanced Design of Glass Structures	Z,ZK	5
1341E06	1E6 Advanced Design of Timber structures	Z,ZK	5
1341E07	1E7 Rehabilitation and Maintenance of Structures	Z,ZK	5
1342C08	2C8 Advanced Design of Steel and composite structures	Z,ZK	6
1342C10	2C10 Design for Fire and Robustness	Z,ZK	6
The aim of this course is to give students an understanding of the design methods of structures at accidental situations, fire and explosion. The course is focussed on all design methods involved in fire design: prediction of fire scenario, evaluation of fire load, calculation of gas temperatures in the fire compartment and structural analysis. Special attention is paid to fire modelling when several design models is presented including nominal temperature curves, simple models and advanced models. Gas temperature in the fire compartment is considered as basis for the structural design. Methods for prediction of temperature of the structural elements are presented and mechanical properties of structural materials (steel, concrete, timber and aluminium structures) are presented. Design models for steel, concrete, steel concrete composite, timber and aluminium structural elements loaded by tension, compression and bending moment are presented. Attention is paid to protection of steel and timber structures to fire, various methods of protection are described. Smaller part of the course is focussed on explosions. Types of explosions are described together with design models. Basic principles of structural analysis are presented. Design methods are explained with focus to increase robustness of the structure. The theoretical part is supplemented with practical exercises using simple design models with aim to apply the knowledge in design of simple structural elements. Understanding of basic principles of structural analysis and design of steel, concrete and timber structures is necessary.			
1342E12	2E12 Design for Renewable Energy Systems	Z,ZK	5
1342E14	2E14 Design of Aluminium and Stainless steel structures	Z,ZK	5
The course will supply students with basic information on material bases, behaviour and design of load bearing civil engineering structures from aluminium alloys and stainless steels. Expansion of structures made of aluminium alloys and stainless steels during last decades will be demonstrated and advantages per chance drawbacks of using these materials will be discussed. The first part of the course will be devoted to structures from aluminium alloys. Selection of suitable materials for given structure, material properties and application examples will be provided. Subsequently primary information on design in accordance with Eurocode 9 (Design of aluminium structures) will supply students with view concerning differences with respect to design of steel structures. Heat affected zone softening (HAZ) will be shown and corresponding effect on design. The course will cover design from the view of both ultimate and serviceability limit states, including design of various types of connections. Finally advanced models beyond elastic limit will be demonstrated and further possibilities of design using educational programme TALAT and others will be provided. The second part of the course will be devoted to structures from stainless steels. Trends in design using stainless steels and recent notable structures will be discussed. Again a survey of general stainless steel materials and those suitable for civil engineering structures will be provided. The information on design will follow Eurocode 3 (General rules - Supplementary rules for stainless steels) and recommendations of Euro Inox. The course will cover design from the view of both ultimate and serviceability limit states, including design of various types of connections. Special attention will be given to erection and installation of stainless steel structures in respect to need of specific treatment, handling and storage of stainless steel elements and structures.			
1343C12	3C12 Theses Final project for Erasmus mundus master course SUSCOS.	Z	30

For updated information see <http://bilakniha.cvut.cz/en/FF.html>

