Schedule of education CST5 2+1 – ST 2015/16

	Lectures	Practical training
1. 24.2	Principle of prestressed concrete. Concrete and steel for prestressed concrete – mechanical characteristics, connection with concrete and location in structure.	Task 1 A: Calculation of characteristics of concrete I cross section – area, moment of inertia, elastic section modulus, core abscissa
2. 2.3.	Prestressing techniques – pretension and post-tensioned prestressed concrete. Advantages and disadvantages of both prestressing techniques. Production – anchorages device and numerous other details.	Calculation of characteristics of prestressed I cross section – area, moment of inertia, elastic section modulus, core abscissa (idealised uncracked and cracked cross section)
3. 9.3	Design of prestressing force and its eccentricity. Stage of prestressing, stage of service. Two characteristic values of prestressing force at serviceability limit states.	Task 1 B: Prestressed I cross section – calculate the stresses in bottom and top fibres by given quality of pressing steel and estimate short and long losses
4. 16.3.	Prestressing force. Losses of prestressing force – short term (immediate) and long term (service life) losses. Simplifying assumptions for calculation of short term losses.	Task 1 C: For simply supported beam with given I cross section and given permanent load calculate rest of live load by full and partial prestress.
5. 23.3.	Arrangement of prestressed tendons and ducts. Durability and cover of reinforcement. Fire resistance. Avoid to brittle failure.	Task 2: Design simply supported pretensionsio-ned beam loaded hollow core slabs: - Design of prestress force and eccentricity
6. 30.3.	Serviceability control. Stress limitation – stages of prestressing and service. Crack control – full, limited and partially prestressed concrete. Deflection control.	- Calculation of short and long term losses - Check the service limit state (stresses, deflection)
7. 6.4.	Ultimate limit states. Design situations. Effects of loads. Effects of prestressing at ultimate limit states. ULS – normal force and bending moment, shear force.	- Check the ultimate limit states
8. 13.4.	Anchorage zones – transfer of prestressing. Pre-tensioned members - transmission length, dispersion length, anchorage length. Post tensioned members – bearing stresses, bursting stresses, spalling stresses.	- Calculation of anchorages zones for pretensioned simply supported beam
9. 20.4.	Statically indeterminate prestressed structures. Design of prestressing using equivalent load and load balancing method. Application on complex spatial	Task 3: Design the flat slabs supported by columns. - Choice the shape of the cables

10. 27.4.	structures. Design of prestressed concrete structures with unbounded prestressing reinforcement. Difference from design structures with bonded prestressing reinforcement. Partially prestressed concrete.	- Calculation the unity prestressing FEM model – load combinations
11. 4.5.	Pre- tensioned prestressed concrete structures. Pre-tensioned framing systems. Types of precast concrete. Double and triple T. Double T floor, Hollow core slabs –use, advantages. Other applications.	- Calculation pressing force and choice of prestressing cables
12. 18.5.	Post- tensioning structures. Applications and advantages of post tensioning. Post-tensioning system. Conceptual design and detailing of typical post- tensioned floors. Other post tensioned structure.	- Assembling of all Tasks

<u>Rules for enclosure of subject CST5:</u>

Credit:

- attendance – max. 3 excused absence
- delivery of all tasks after preliminary check by teacher

Exam:

- receive the credit (in KOS)
- written part of exam (ca 2 hours): answer on given questions, practical example
- oral part of exam (ca 20 min.): supplementary questions from lectures and practical training