załącznik do Regulaminu programu „visiting profesor”

Osoba zgłaszająca z PW	
Tytuł i stopień naukowy	dr inż.
Imię i nazwisko	Marta Lutomirska
Wydział	Inżynierii Lądowej
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Propozycja osoby zgłaszanej jako visiting professor	
Tytuł i stopień naukowy	Profesor, dr
Imię i nazwisko	Andrzej S. Nowak
Dokładna afiliacja	Auburn University, USA
Mail kontaktowy	asn0007@auburn.edu
Opis osiągnięć (1/2-1 strony)	Andrzej S. Nowak is Professor and Department Chair of Civil and Environmental Engineering at Auburn University, after 25 years at the University of Michigan and 8 years at the University of Nebraska. He received his MS and Ph.D. from the Warsaw University of Technology in Poland. His area of expertise is structural reliability and bridge engineering, and major research accomplishments include the development of a reliability-based calibration procedure for calculation of load and resistance factors. The procedure was successfully applied on calibration of AASHTO LRFD design code for bridges, ACI 318 Code for Concrete Buildings, Canadian Highway Bridge Design Code, and British Standard BS-5400. He made important contributions in the area of bridge diagnostics and evaluation, including analytical load models used for prediction of extreme load events for bridges and buildings and the development of efficient experimental procedures for weigh-in-motion measurement of truck loads, dynamic loads on bridges and fatigue load spectra. In the area of materials, Prof. Nowak has developed a design guide for self-consolidating concrete (SCC), including field applications. Prof. Nowak has authored over 450 technical publications, and chaired a number of committees associated with professional organizations such as: ASCE, ACI, TRB IABSE and IABMAS. He has an Honorary Doctoral degree from the Warsaw University of Technology, and he is a Fellow of ASCE, ACI, PCI and IABSE. Prof. Nowak received the ACI Charles S. Whitney Medal, for the development of reliability-based code calibration procedures, American Concrete Institute 2023, Mete A. Sozen Award for Excellence in Structural Research, American Concrete Institute 202,

	Stefan Kauffman Medal, Polish Society of Civil Engineers, 2017, ASCE Moisseiff Award, IFIP WG 7.5 Award, Bene Merentibus Medal, and Kasimir Gzowski Medal from the Canadian Society of Civil Engineers.

Code of the course	4606-VP-ES-00005	Name of the course	Polish	**Niezawodność Konstrukcji**	
			English	**Reliability of Structures**	
Type of the course	Specialty subject				
Course coordinator	Prof. Andrzej S. Nowak	Course teacher	Prof. Andrzej S. Nowak		
Implementing unit	Faculty of Civil Engineering	Scientific discipline / disciplines*	Civil Engineering, Geodesy and Transport Materials Engineering, Mechanical Engineering, Environmental Engineering, Mining and Energy		
Level of education	Doctoral studies Master Studies	Semester	Fall (hybrid: stationary - 30h, online - 30h) 16.X - 20. XII. 2024		
Language of the course	English				
Type of assessment	Pass or Fail	Number of hours in a semester	60	ECTS credits	5
Minimum number of participants	10	Maximum number of participants	100	Available for students (BSc, MSc)	Yes

Type of classes		Lecture	Auditory classes	Project classes	Laboratory	Seminar
Number of hours	in a week	-	-	-	-	-
	in a semester	30	-	30	-	-

* does not apply to the Researcher's Workshop

1. Prerequisites

Basic mechanics, structural analysis and design

2. Course objectives

The objective of this course is to (1) develop understanding of the reliability-based methods of structural analysis, (2) learn about quantification of risk, (3) perform efficient interpretation of statistical data base, (4) apply risk analysis in calibration of safety margins, (5) gain hands-on experience in reliability applications in solving engineering problems.

3. Course content (separate for each type of classes)

Lecture

The course covers the following major areas: (1) Applied probability and statistics, (2) Reliability analysis methods including iterative procedures, Monte Carlo simulations, (3) Development of design codes, (4) Code calibration procedures, (5) development of statistical models for load and load combinations, (6) Development of resistance models, (7) Development of system reliability

models: series, parallel and mixed, (8) Practical applications of reliability analysis to structural members and structural systems, and (9) Modeling of human error in design and operation.
Project class
Practical application of the theory discussed during lectures. Solving exemplary problems.

4. Learning outcomes			
Type of learning outcomes	Learning outcomes description	Reference to the learning outcomes of the WUT DS	Learning outcomes verification methods*
Knowledge			
K01	Understanding uncertainty of loads and resistance, statistical parameters	SD_W1	homework
K02	Reliability analysis procedures	SD_W2 SD_W3	homework
K03	Code calibration procedures	SD_W2 SD_W3	homework
Skills			
S01	Efficient processing of big statistical data	SD_U2 SD_U6	homework
S02	Calculation of load and resistance factors	SD_U1 SD_U6	homework
Social competences			
SC01	Team research	SD_K5	Project evaluation

*Allowed learning outcomes verification methods: exam; oral exam; oral test; project evaluation; report evaluation; presentation evaluation; active participation during classes; homework; tests

5. Assessment criteria
Students will be assigned homeworks, 3 individual and 1 team assignment

6. Literature
Primary references: [1] Nowak, A.S. and Collins, K.R., "Reliability of Structures", CRC Press, New York, 2013. [2] Benjamin and Cornell [3] Melchers [4] Augusti Secondary references: [1] ASCE Standard 7, 2022 [2] American Steel Construction Institute. Allowable Stress Method. Design of beams, girders, columns and trusses. [3] American Concrete Institute. Design of reinforced concrete beams, with single and double reinforcement, slabs, columns axially loaded and eccentric (without prestressed structures). [4] National Forest Products Association. Design of beams and columns. [5] American Association of State Highway and Transportation Officials. Design of steel bridges, main members only. [6] American Iron and Steel Institute. Design of cold-formed beams and columns. [7] American Association of State Highway and Transportation Officials. Design of prestressed concrete bridges, main members only.

[8] American Concrete Institute. Design of prestressed concrete beams and slabs.
[9] American Steel Construction Institute. Load and resistance factor design. Design of beams, girders, columns and trusses.

7. PhD student's workload necessary to achieve the learning outcomes**		
No.	Description	Number of hours
1	Hours of scheduled instruction given by the academic teacher in the classroom	60
2	Hours of consultations with the academic teacher, exams, tests, etc.	20
3	Amount of time devoted to the preparation for classes, preparation of presentations, reports, projects, homework	25
4	Amount of time devoted to the preparation for exams, test, assessments	15
	Total number of hours	**120**
	ECTS credits	**5**

** 1 ECTS = 25-30 hours of the PhD students work (2 ECTS = 60 hours; 4 ECTS = 110 hours, etc.)

8. Additional information	
Number of ECTS credits for classes requiring direct participation of academic teachers	2
Number of ECTS credits earned by a student in a practical course	2