



### Wide Area Monitoring, Protection, and Control

**Instructors:**  
**Hassan Bevrani and Hémin Golpira**

**Saturday: 14:00-16:00; Venue: 301**  
**Tuesday: 14:00-16:00; Venue: 408**  
**Course link: [WAMPAC \(uok.ac.ir\)](http://WAMPAC.uok.ac.ir)**



Spring 2024

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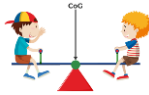
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### Outline

- 1 Self Introduction
- 2 Course information
- 3 Grading
- 4 Access to the courses
- 5 References
- 6 Projects vs homework vs pre-task



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### Hassan Bevrani

- Professor of Control Engineering
- PhD degree in electrical engineering from [Osaka University](#), Osaka, Japan, in 2004
- Post-doctoral fellow, senior research fellow, [visiting professor](#), and professor in several universities in [Japan](#), [Australia](#), [France](#), and [Germany](#)
- Fellow member of [IEEE](#)
- Research interest: [smart grids](#) and [microgrids](#) control; applications of [robust](#) and [intelligent](#) control techniques
- Author/coauthor of [9 books](#), [15 book chapters](#), and over [450 papers](#)
- Recipient of the prestigious 2023 [IEEE Transactions on Power Systems](#) best paper award.
- Associate editor for [Journal of Modern Power Systems and Clean Energy](#)

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## Personal page

September 24, 2020

University of Kurdistan

**Hassan Bevrani**

Academic name: Professor

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News <https://research.uok.ac.ir/~bevrani>

- Webinar: Microgrids Concepts and Control
- Webinar: Community Microgrid, where Resilience Meets Economics and Clean Energy
- Webinar: Smart Grids for Smart Cities
- Webinar: Perspectives on 5G and IoT connectivity: Ultra-reliability, massiveness and distributed ledgers



## Hémin Golpira

- Associate Professor of Power Systems
- PhD degree in electrical engineering from Tarbiat Modares University, Tehran, Iran, in 2014
- Associate research fellow in University of Wisconsin-Madison, USA
- Visiting professor in Ecole Central de Lille and Ecole Central de Nantes, France.
- Senior member of IEEE
- Research interest: [Renewable-integrated Power System Stability and Control](#)
- Recipient of the prestigious 2023 IEEE Transactions on Power Systems best paper award.
- Awarded 2022 IEEE Young Researcher Award;
- 3rd Ranked Award, 17th Kharazmi Youth Festival
- Associate editor for IEEE Transactions on Power Systems, IET Generation, Transmission and Distribution, and Electric Power Systems Research
- Author/coauthor of 1 book, and over 60 papers



## Personal page

<https://prof.uok.ac.ir/h.golpira/index.htm>

University of Kurdistan  
Sanandaj, Kurdistan, Iran

**Hémin Golpira**  
Associate Professor, Power System Engineering  
Power System Modeling & Simulation Lab.

Hémin received the B.Sc., M.Sc., and Ph.D. degrees in electrical engineering in 2007, 2009, and 2014, respectively, all with honors. During 2014 and 2015 Hémin was with the University of Wisconsin-Madison, Power System Engineering Research Center (PSERC) and Wisconsin Energy Institute (WEI), USA, as Associate Research Fellow. In 2016, Hémin joined the University of Kurdistan, Sanandaj, Iran, as assistant professor. During 2019, 2021 and 2023, Hémin was visiting professor with Ecole Central de Lille, and Ecole Central de Nantes, France. Hémin is the recipient of the prestigious 2023 IEEE Transactions on Power Systems best paper award. He is associate editor of IEEE Transactions on Power Systems, IEEE Power Engineering Letters, IET Generation, Transmission & Distribution, and Electric Power Systems Research. His research interests include power system dynamics and stability, renewable energy integration, power system modeling & simulation, power system operation and wide area control. Hémin is a senior member of IEEE.

Education & Experience

Honors & Awards

Publications

Projects

Courses & Research

Books

C.V. (pdf) Contact





### Course preview

#### Defination Stability, control, monitoring and protection

- Defining of the terms
- Case studies, benchmarks
- Integrated studies or pure studies?

#### Category 2 Frequency

- Defining of frequency stability
- Control loops
- Dynamics of interest
- Protection

#### Category 3 Voltage

- Defining of voltage stability
- Instability or collapse?
- Stability criteria
- Protection

#### Category 4 Rotor angel

- Defining of small and transient stabilities
- Types of instability
- Control loops
- protection

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### Grading

Homework/Pre-task	Final Exam	Project Reports and Presentation
<ul style="list-style-type: none"> <li>• Participation: 20%</li> <li>• Pre-task based on the IEEE taskforce report</li> <li>• Homework defines during semester</li> </ul>	<ul style="list-style-type: none"> <li>• Participation: 30%</li> <li>• Exam date: 12/04/1402</li> </ul>	<ul style="list-style-type: none"> <li>• Participation: 50%</li> <li>• Starts by defining appropriate benchmark</li> <li>• During the course the project will be completed</li> <li>• Report with simulation files</li> <li>• Meeting in the end to present the results</li> </ul>

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### References

- 1- Hémin Galpita, Arturo Román-Messina, and Hassan Bevrani. *Renewable Integrated Power System Stability and Control*. Wiley-IEEE Press, 2021.
- 2- Bevrani, H., Watanabe, M., and Mitani, Y. *Power system monitoring and control*. Wiley-IEEE Press, 2014.
- 3- Hatzigiayriou, N., Milano-vi, J., Rahmann, C., Ajarapu, V., Cañizares, C., Erlich, I., ... & Vournas, C. (2020). Stability definitions and characterization of dynamic behavior in systems with high penetration of power electronic interfaced technologies. IEEE PES Technical Report PES-TR77.




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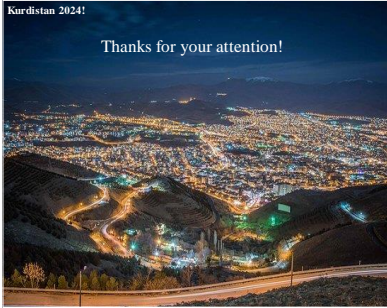
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